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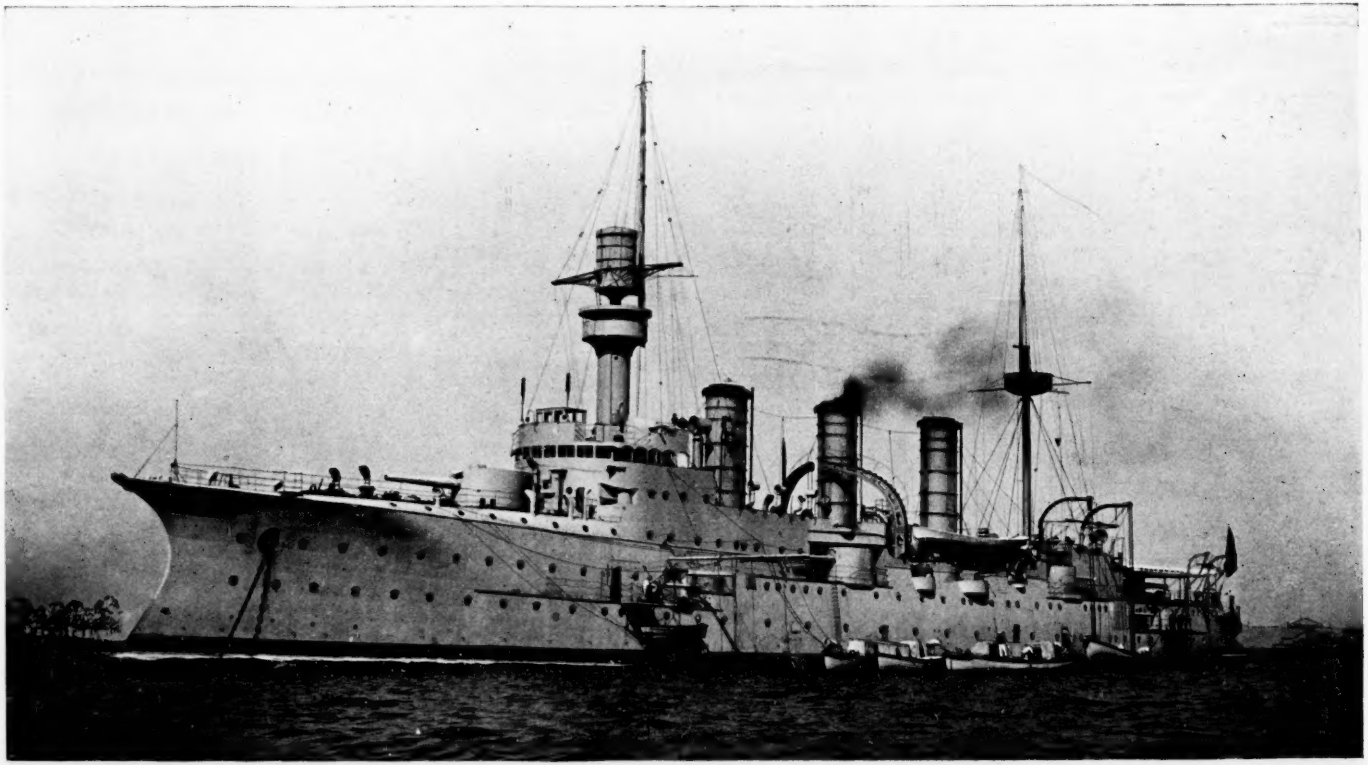

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LECTURE NOTICE.

"The Recruit, from a Depôt Medical Officer's point of view." By Lieut.-Colonel C. M. Douglas, V.C., M.D., (Hon. Brig.-Surgeon), Wednesday, 25th October. The Chair will be taken by Major-General J. F. Maurice, C.B., R.A., *p.s.c.*, Commanding Woolwich District.

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A FEW NOTES ON THE CHARACTERISTICS OF HILL-FIGHTING IN INDIA, AND THE TRAINING OF INFANTRY NECESSARY FOR THE SAME, POSSIBLE IN ENGLAND.

By Major-General Sir W. F. GATACRE, K.C.B., D.S.O., p.s.c., Commanding Eastern District.

Tuesday, May 30th, 1899.

General Sir JOHN J. HOOD GORDON, K.C.B., in the Chair.

"UNDER the shadow of the drawn sword lies Paradise" is the motto of the man who meets us on the hillside, and experience teaches us that he acts up to his belief in this motto.

The study, therefore, of the subject of my notes is of first importance in our English military life, as from the frequency of the disturbances which occur in the country, aptly named by Rudyard Kipling "the all things possible Border," and to the constant increase and improvement in arms amongst the hill tribes in the North-West, it is imperative that the British officer and soldier shall be fully prepared for the tactics of Indian fighting-men, many of whose leaders and rank and file have been trained in our Indian Army, and who, having taken their discharge, have returned to their own homes to bring the result of our discipline and their own astuteness to bear against all comers, be they white men or black.

We must recognise that the training received by our Indian Native Army converts such born good shots as the Pathans are into an enemy who will continue to improve in efficiency day by day as rifles grow cheaper,

ammunition more plentiful, and as our own system of training grows more perfect. Not only this, but in the great mountains where water hardly exists, the hill-man of bone and muscle, who lives in the open, who is accustomed to travel over bad ground with a load on his shoulders by night as easily as by daylight, who loves the sun, and who hardly perspires in mounting to the highest ridges, is, from the perfection of his physique and condition, more than a match for the European soldier, when it comes to a race for the possession of a height or a point of vantage.

I always liken the manœuvres of a well-trained force engaged in mountain warfare to the movements of an animal watching its prey, endeavouring to conceal itself while stealthily moving onward to attack. This is the method of fighting adopted by wild men.

I am quite aware of the impossibility of concealing the movements of a large force, but the foregoing principle is that upon which even the largest unit should act in the country of an enemy.

Characteristics of Hill-Fighting.

Now, the characteristics of hill-warfare may be briefly summed up as follows:—Difficult ground, requiring men to be in very good condition to cross it without undue delay, and yet to arrive at their objective fit to shoot accurately; no road, or at most a rocky track, for the transport, necessitating pack animals being spread out over miles of country; a hot sun, with probably no water to be met with on the road; an elastic enemy who shoots well, never tires, but who rarely stands a resolute assault; constant delays on road, owing to difficulties of route, necessitating road-making, cliff bridge-building, etc.; continual sniping at night, which breaks the rest of the tired soldier.

Any retirement, even after a successful action, is followed up by the elated savage, who mistakes the return to camp for a signal of defeat.

To train Englishmen for this kind of warfare, or to manœuvre them against an active, determined enemy, such as opposed the advance of our Indian Army during the recent campaign in Tirah, cannot be undertaken casually, as anyone acquainted with the hill tribes of India, and who knows their cunning and fanatical bravery, will understand.

Additional Courses of Training Inexpedient.

Taking our course of instruction to the soldier which lasts the whole year round, I do not think it possible to give additional training. Our courses are good; any further tax on the young soldier's time would prejudice recruiting; the strict discipline in the Army and the fact of a man always being under the eye of a non-commissioned officer, on duty or off, keep many men who would make good soldiers out of the Army.

I think it is the application of practical experience to the present Drill-Book, rather than the introduction of any new form of movement, that is required, and officers must devote their attention to extracting

more intelligence out of their men in carrying out their company training, which must include all the subjects of vital importance to the efficiency of the British soldier employed in India.

PRINCIPAL POINTS TO BE OBSERVED IN OUR TRAINING.

To meet the above, our attention must principally be directed to the following points:—

1. Our men must be in the pink of condition.
2. Officers must be thoroughly well trained in the choice of ground for an advance or retirement under cover; able to move troops over difficult country in such a manner as to secure a minimum of loss; to place them in position, well concentrated, and whence they can bring their fire to bear on the approaching enemy.
3. To perfecting our shooting in both individual and collective firing.
4. To regulating the pace over bad ground, that troops shall not be unduly fatigued.
5. To elasticity of movement when in extended order.
6. To training men to the habit of greater observation and watchfulness of what is going on around them, whether in peace or war-time.
7. To instant obedience to the order or signal of an officer.

There are certain other golden rules which must be rigidly adhered to in hill-fighting. The first perhaps of these is that:—

RULES TO BE OBSERVED IN HILL-FIGHTING.

8. Men must have food before they move in the morning.
9. An early start must be made to enable the fight to be fought, and the force if necessary withdrawn to camp, by daylight. Two or three hours' delay in starting back to camp, in a country which passes from daylight to darkness in a few moments, may be a very serious matter; in any case, it will cause serious discomfort to officers and men.
10. In attacking high ground, troops should always be moved up the ridges of the spurs, never by the valleys, as by the former plan the force gets the advantage of ground and will probably have at least one flank sheltered by the back of the ridge; further, the force can act on either side of the ridge and can avoid the showers of rocks launched from the crest of the hill by its defenders.
11. To keep the command together and to send no detachment on any duty which is not strong enough to give a good account of itself, for it has been in saving detachments which have been cut off or surrounded that so many of our casualties have occurred.

Hints.

In the following notes I have endeavoured, without travelling over old ground in the Drill-Book, to jot down certain hints which strike me as applicable to hill-fighting in India, and which I have found useful.

In that country our enemy always sleeps in his position on the high passes which guard his home; he is accustomed to cold; he can do without food and blankets better than a European; he has no animal transport to hamper his movements, consequently it always falls to the British soldier and his Indian comrade to attack the position; and when the hill-man is turned off his heights, he can cover the ground to the next ridge in one-third the time the British soldier can accomplish the distance.

An Englishman therefore cannot be in too good training for this kind of work, and steady short route marches, with good rations, must be relied on to turn him out fit for his work.

I think in route marching it is better to adhere to short marches, not exceeding six miles with a manœuvre or drill in the centre of it, rather than to continue increasing the distance by progressive increments, as we do now.

Route marching is very monotonous, and the soldier dislikes it, as he gets no fun out of it; the case is different in India, where field-firing over good hilly ground is practicable; this makes an excellent combination with route marching.

Valuable Exercises at Camps of Instruction.

Though we have not the necessary broken ground to train in, we must, in all our camps of exercise, give due regard to those duties which, unlike fighting, fall daily to the lot of the soldier when on service; and it is in these we must train our men thoroughly if we wish to fit them for Indian warfare. We may class the mas under, *i.e.* :—Choice of outpost positions; road-making on a large scale by complete units; movement of baggage in convoy; protection of camps; arrangement of water-supply; choice of suitable positions for pitching bivouacs, so as to habituate officers and men to making themselves at home in whatever position they find themselves.

The above principle must find place in all inspections, and general officers should require any regiment under their command to be able, at a few hours' notice, to turn out, be prepared to move five or six miles, make a road or throw a bridge, or both, and select a bivouac. Officers should write down their orders and arrangements for carrying out such work, and this would be remarked on by the general officer.

The expense would be very small and the experience valuable, and the general officer would see in a connected manœuvre the many exercises that he now reports on singly in his yearly report, *i.e.*, the efficiency of the corps in signalling, loading, marching, shelter-trench, etc.

Besides, the interest raised and the experience gained in such a programme will ensure better attention to these things and a more

satisfactory result from the expenditure of money annually granted to manœuvres. Where single corps are inspected it would nearly always be possible to arrange for some other corps in the garrison or camp to take the opposite side, or failing this, for a portion of the corps inspected to act the *rôle* of an enemy.

Ordinarily, I think, field manœuvres lack interest to the infantry portion of the force, who march perhaps nine or ten miles but see very little—for the cavalry are miles ahead of them—have long weary waits, and when the attack is over, and the "Cease fire" sounds, it is too late in the day to commence work on any fresh instruction.

In very few instances during peace manœuvres do we see piquets remaining on their ground all night,[1] as they would ordinarily do in warfare, or camps being made defensible or water supplies being prepared.

The reason of this is no doubt partly because we have to study our recruiting and cannot afford to work our lads too hard, and partly because in England we can neither cut down trees nor interfere with the standpipes.

But all these things must be done as regular as clock-work on service; and if we do not train up our men to it in peace-time we shall always be liable to accidents on service through some stupid oversight. Provided men come from a healthy station and are properly and systematically trained, condition is a matter of a week's marching, and can be gained between the hour of warning and the date of departure for the front; but the daily duties indicated above cannot be learnt in the week prior to marching off.

The following lessons should be learnt at practical manœuvres; all can be learnt in India, but at home it is impossible, for want of animals, to learn thoroughly that part which refers to pack transport:—

Lessons to be Learnt at Manœuvres and Company Training.

Different ways of outlining hill roads; methods of construction; use of wood in road-making; object of zigzags on a hill; class of tools required; different gradients for various kinds of transport; method of obtaining roughly such a gradient; necessity of cutting the roadway deeper inside than on the outside edge; culverts, where required and how constructed; use of explosives in road-making; adequate amount of finish on each particular job; how to use various tools; felling trees, an important matter, as troops have to cut their own firewood and from ignorance break a great many tools when first they go on service; precautions to be taken by working parties for care of arms and against surprise while at work; action when suddenly attacked; best position for covering parties, which should be proportionate to the number of "shifts" available; necessity for care in loading pack animals; the care of transport animals on the line of march—their food, water, clothing, their saddlery and gear; how to make troughs for them if timber is available or if not; standing places to be terraced, if ground is on steep slope.

[1] Tents can be used without destroying the value of the exercise.

Difficulties experienced in marching in an enemy's country along narrow tracks in the hills, where the advance is slow from one cause or another, as it is necessary for the baggage to load up and move behind the column; when the advance is checked, the mules have to stand for hours under their loads, which is fatiguing to the animals and productive of sore backs; impossibility of "lifting" loads, in many cases owing to the paucity of baggage guard; delay which would ensue in the advance, if loads were taken off during many halts; difficulty of turning a long line of loaded animals to the right-about; danger of a block on a narrow track, to animals, which are apt to push one another over the "khud"; ease with which a long convoy can be attacked when passing along a track through jungle, especially in hilly ground; impossibility of parking transport under such circumstances; difficulty in meeting such isolated attacks; proper distribution of convoy or baggage guard to secure protection of drivers and animals and to prevent straggling; necessity of having a strong party with the rear animals, as hill-men generally follow up; arguments for and against driving or leading transport animals.

Night attacks to test the value of the positions of the various guards and piquets; to demonstrate the danger to piquets (from friendly bullets) if placed in wrong positions, and to show within what range a cunning and determined enemy can approach a protected camp. The following points to be impressed on the men:—The security afforded by breastworks, sangers, brushwood, against a sudden rush, as a set-off against the heavy work sometimes entailed on them when they come into the new camp after a hard day's work.

The impossibility of patrolling at night in a jungly country except along roads and in strong force.

The ease with which arms can be stolen from camp, and means of prevention.

Responsibility of Company Commanders.

A regimental commanding officer must recognise that, once on the hills, he must be prepared to relax control of his regiment, which owing to accidents of ground will pass to the executive command of the company leaders. When this takes place he will feel, perhaps for the first time, the immense importance of so training his officers that he can feel confidence in their leadership, and that knowing his intention and orders, his subordinates will co-operate to the main object, putting from them any one-sided effort to gain personal distinction for themselves or for their companies, unless it happens to be furthering the main object of the movement.

Soldier's Early Meal.

One very special point to be attended to in hill-fighting is the provision of a meal before the soldier marches in the morning, *i.e.*, some portion of his meat ration with his morning tea. Ordinarily the soldier will get half-a-pint of tea and a biscuit; but the hot sun soon tells on this scanty diet, and makes a man feel faint. The provision of food in the early morning requires a good deal of forethought, on account of the

impossibility of cooking anything but tea before starting. In cold countries the difficulty is not so apparent, as fermentation does not set up so quickly, and a cooked meat ration can be carried; but in a hot climate, where neither cooked nor uncooked meat will keep, it is difficult as well as dangerous to cook meat overnight and place it in the mess-tin. Meat cooked beforehand in this way gets quickly tainted and discoloured from the action of fermentation on the surface of the tin.

The only solution to this difficulty is to issue a portion of preserved meat with the fresh meat rations for all marching days, the fresh to be eaten on the day of issue, the tinned meat being consumed before starting in the morning.

If this is worked judiciously, no loss accrues to the State; whereas under the existing system of carrying cooked rations, an officer who cares for his men's health is bound to issue a replacement of all sour food, on the spot; this, while being the right course to pursue, may place an officer moving with, say, three days' rations which have to last three days, in an awkward position.

Protection of Line of Route.

The necessity for seizing and holding points of vantage along the line of advance or retirement of a column must be impressed forcibly on officers and men, such points should be chosen for their command of ground from which the column can be shot at or rushed.

The officer commanding the advance or rear guard must mark these spots as he moves, by dropping two or three men, to fire on any dangerous places; these men should be relieved by a similar number from the next unit in succession, and should join the rear company as soon as they have been relieved; care must be taken that these men do not get left behind. As a rule, there should be no space between the advance guard and main body of a force, as owing to the narrowness of track, the difficulty is to keep the force sufficiently concentrated, and if the ordinary rule of spacing be applied, the column becomes of inordinate length. In rear-guard actions it is important that a strong section, proportionate to the size of the body being covered, should form the point of the rear guard; if a small point only is left, and casualties occur, the officer in command finds himself delayed, many wounded men to carry, and no one to carry them, as all his available men are firing; and as it is very difficult to keep touch in retiring on a hill road, there is much likelihood of the rear party being cut off.

Slow Leading in Hilly Ground.—Pace of Leaders.

Where troops are working in broken or hilly ground, the leading must be slow if the men are to be kept together. Men heavily encumbered as they are cannot be expected to travel as quickly over bad ground as their officers, who have merely to carry their swords and revolvers. In mounting a ridge, a unit if hurried, gets very much scattered, owing to the nature of the ground and the inability of some men to keep up with the

remainder. Officers must be taught, therefore, to constantly halt their command and to draw up its tail, and not till units are concentrated must a forward movement take place; to ensure this, one officer of a company should invariably march in rear of his last file. This makes the upward movement of a large and extended force very slow, but it must be accepted as a fact that it is a necessity, and is the only safe way of arriving on the ridge with all your strength in hand.

Cover.

In hill-fighting, cover *must* be taken advantage of. One sometimes hears that men once under cover are difficult to move forwards; but we cannot accept this theory, nor allow that our men when led by well-trained officers they like, will not follow their commander anywhere.

It is difficult on the barrack-square or in a flat grass field to make the soldier believe he is hill-climbing under fire, but a great deal of valuable habit can be taught on the steep slopes of the downs and in many parts of England and Scotland. What we really require is a large stretch of broken rocky ground, so as to make the education of the recruit as realistic as possible; and it is hoped that Government will see its way to purchasing good manœuvring ground of this kind in some hilly district.

Charging at the Double.

To charge at the double, as taught in the Drill-Book, is not practicable on the hill, except in some of our war correspondents' clever pictures.

A man burdened with his great-coat, rifle, belts, bayonet and haversack, not to mention 100 rounds of ammunition, cannot run, or, if he essays to, will so fatigue himself that he will be unable to meet the shock when the supreme moment arrives.

Young officers are apt to overlook the fact that, as they carry no weight, they are able to move faster than their men. It is understood, of course, that the above does not refer to rushing a few yards to cross a zone of fire. Men are sure to do this without previous training.

Covering a Movement by Fire.

Possibly the most important exercise in our training is the covering by fire the movement of the firing line or assaulting unit, without which diversion the attackers are bound to lose heavily. Of course, if the ground favours the attack, it may be possible to detail a strong party to cover the movement with a continuous fire, from a flank or knoll; in other cases troops may be trained to fire from the hip or arm while moving, but this latter does not bring a very reliable or killing fire on men in trenches or under cover; it merely tends to make the defence unsteady in his aim, and this is something. Firing from the hip is a very common practice amongst Pathans and Ghurkas, who, when approaching jungle on the hill, fire into it on the chance of disturbing an ambush or drawing fire.

Natural Difficulties in Indian Fighting.

One has sometimes heard people ask why troops which have been sent forward to make a reconnaissance, or to seize some commanding position, have quitted the position and returned to camp before nightfall, thus possibly rendering it necessary to re-occupy the same heights or pass, the following day.

We must remember that men and animals who, heavily loaded, have been working over impossible ground, must have food and water. Now, owing to the nature of the ground, it is impossible always to take the necessary number of transport animals; it follows, therefore, that water can only be carried for men, and for them only in limited quantities. This being so, a commander in certain cases may be obliged to bring his column back to his supplies, forage, and water. If these necessaries are taken with the column it means miles of single-file animals, difficult to watch, almost impossible to guard, over ground where attack can be made from all sides. Putting such cases, however, aside as exceptions, it is a sound rule to sleep on the position gained, otherwise the hill-man is apt to mistake a retirement for a retreat, and to become troublesome accordingly.

Convoys and Transport.

The care and management of convoys is a very important feature in hill-fighting, but it can practically only be taught in India, where Government maintains a strength of about 20,000 mules. A few words on the subject may fit into these notes.

The excellent results of the training of officers and men in transport duties during the last 15 years in India, cannot but be highly satisfactory to the military authorities; and the number of officers who have passed the course at home and abroad and have been employed in the various campaigns on the frontier, must act as an incentive to others to go and do likewise.

We cannot have too many officers trained in this respect; every officer and every man should know more or less about the animals on which his comfort, health, and movement depends; and this knowledge is not to be gained in the field—it must be learnt in peace-time and perfected across the frontier.

The duties of a transport officer are not confined merely to looking after the comfort of his animals and attendants; he is the man upon whom so much depends in the management of a convoy on the road, its punctual start, its good loading, its being kept closed up, and, when attacked, its being got into the safest place, if any movement off the road is possible.

The prevention of straggling and opening out of convoy is one of the most difficult matters the transport officer has to contend with, and the safety of the convoy and that of the drivers is intimately bound up in it. Natives, from one cause or another, will get off the path and, regardless of all danger and warnings, stroll along behind the escort they have eluded.

The men of the guard, however sharp they may be, are powerless to check this, for a native dives into the jungle, lies *perdu* till the guard has passed, and then resumes his march.

In many cases where, for instance, animals with their drivers are left behind, guards are undoubtedly to blame, and for this no excuse should be accepted.

Transport officers accompanying convoys should make themselves acquainted with the non-commissioned officers and men of the guard; should personally give them their orders, see that they understand them, and report on arrival to the officer in charge of the post any special smartness or want of intelligence displayed by the sergeant or his men. It is in this way only that this monotonous duty can be properly carried out.

Where convoys are passing through a subdued district month after month, it is difficult to keep the men's interests centred on their work, and they are apt to get slack; but this must call for increased energy and watchfulness on the part of the officer.

How often on convoy duty has one not seen parties and files of the escort, moving along, thinking absolutely about nothing, instead of having their whole attention centred on their surroundings, to note anything extraordinary on the line of march. Of course, this does not mean that men should march at attention; that would be as fatiguing as it would be unnecessary.

Ambush.

In moving convoys along stages day after day on the same route, one is apt to lose some of the leading men of the escort by ambush, as hill-men have a trick of shooting from some cranny high up above the road and then getting away long before the escort can hope to reach them; it is often impossible to move flank guards through such ground as one meets on the frontier.

The ordinary method of safe-guarding a convoy is, of course, to select salient points along the route, whence parties of men can cover with their fire any specially dangerous bits of ground. I have found it on more than one occasion a good plan where cases of ambush have occurred on certain sections of the route, to move a party of good shots under a special officer along the road an hour or so before the convoy's regular starting hour, so as to take by surprise the mountaineers on the watch. These men will have lain out all night, and are sure at dawn to rise and stretch themselves, or move about for various purposes, not counting on such an early advance party.

Necessity for Instant Attention to Command.

We must teach the young soldier that his life and the lives of his comrades may, at any moment on service, depend on prompt obedience to the word of command or signal of his officer or non-commissioned officer, and that at all drills his attention must be exclusively on his work, as it is bound to be when in reach of the enemy.

To ensure this prompt obedience, the soldier must not be kept at attention longer than necessary. At halts, unless the ground is wet, men should be taught to get the maximum of rest by sitting or lying down. They soon learn to appreciate this. This was well illustrated during the forced march on Berber from Abudis, during the recent Soudan expedition.

The British Brigade, composed of Warwicks, Lincolns, and Camerons, had to march night and morning for four days in the hot weather. Owing to the power of the sun, it was unavoidable that the bulk of the march should be done at night, and as a double march had to be got over daily, it was necessary to allow only a brief period of repose between. Thus we marched generally from 4.30 p.m. to 10 or 11 p.m., and from 3 a.m. to 11 a.m.

This made the men feel the continued strain, and they required no inducements to lie down on the line of march when the halt was ordered. It is not going beyond the truth to say that the whole brigade, with the exception of a few officers and the look-out men, dropped on the word "Halt!" and were asleep in a moment; but it was pleasing to see that on the signal to move, usually seven minutes later, the column was up and moving quickly.

This practice of teaching men to lie down in their tracks at the slightest indication from their immediate commander is a thing to be encouraged in all soldiers. It may prevent the movement of a unit being observed, or it may save a company from the effects of a hostile volley.

Helmets—Pattern of.

A soldier's head-cover is a matter of great importance in any hot country, but especially in the Indian hills. Without a good pattern, he is liable to sunstroke and fever from the great heat in the valleys. The Egyptian pattern is the best I have seen, and all soldiers serving in tropical climates should wear them. The difference between this pattern and the helmet in use in India lies in the extra spread of the sides, peak, and back of the former, which protects the temples, eyes, and neck from the sun.

Field-Firing.

One great drawback to our limited drill areas and rifle ranges is the impossibility, in most cases, of firing in any direction while field-firing, except towards the butt; this prevents the natural use of flanking fire, or of firing at any target that is not in a straight line with the butt; after all, field-firing with ball is the nearest approach to shooting on service, and wherever it may be possible on sea-side ranges and certain others, this most valuable practice should be carefully taught. In India there is little difficulty at most stations of finding good ground, where this part of the soldier's training can be thoroughly carried out, and it is there he must complete his education of getting thoroughly accustomed to use his loaded rifle with the confidence he can never attain with blank ammunition.

To sum up these notes, then, I think we require no special forms of drill for hill-fighting; but we want a training ground which is similar

somewhat, though on a small scale, to that on our Indian border, *i.e.*, we require hilly ground, broken up as much as possible, so that we can indicate to the soldier the meaning of a hill, a ridge, a valley, etc., and the reason for moving troops up one in preference to the other; also to enable us to teach him the value of cover, not only for himself as an individual, but for bodies of troops; to show him how to lay out and make hill-roads for his transport, how to defend on such roads his convoy —in short, to teach him all those things which help to make for fighting in the hills.

Above all, we require officers, by careful teaching, to extract greater attention and more intelligence from men in their drills and manœuvres. This can only be done by increased study by officers of our previous experiences in frontier wars, and by their imparting the result in the simplest and most realistic manner to their men. This should enable us to meet the fighting hill-man on his own ground with every confidence—and confidence, especially when fighting Asiatics, means success.

I fear I have not made a very interesting lecture, but I have merely put down the chief points to which I think the attention of officers and men should be directed when they study this subject. Possibly you will say, "You have put down a good number of suggestions and hints, but you have not told us how to meet them." Well, I think all these heads which I have put down have been thrashed out before, and as a matter of fact in hill-fighting you never get two examples like one another. Everyone has to act on his own responsibility, and on his own initiative at the moment; but provided you study those subjects about which there is so much literature extant, and really know how to get as much intelligence as possible out of your men, I do not think any officer need dread leading men up a hill. The one thing we require, of course, is to get some hill-fighting, and though I believe it is beyond the bounds of possibility now that any officer could get up and recommend hill-fighting, or any other kind of fighting, you will recognise that without hill-fighting we cannot teach our men really what we require them to do. Therefore I hope that any other officer who is in favour of hill-fighting, or the reverse, will get up and comment as adversely as he can upon the notes I have put down.

Lieut.-Colonel EDWARD GUNTER, *p.s.c.* (late East Lancashire Regiment):—When an officer fresh from recent experience of war comes to give us the benefit of his experience in this Institution, we are very much indebted to him. When that officer is a general of the splendid reputation of Sir William Gatacre, we feel very much honoured indeed. No subject is more important to our Army than the training of soldiers in hill-fighting, and no one is more competent to give us advice on the subject than the gallant lecturer. When our men are led with the bravery, energy, and endurance that he has shown, they will go anywhere and do anything. I agree with the gallant lecturer in almost all the points that he has brought forward, but I should like to emphasise briefly one or two which are, I think, of especial importance. I am very glad to see that the General has laid some stress upon individual shooting as well as on collective firing. So much has been said about our men being trained to collective firing, that I think excellence in individual shooting has been perhaps a little overlooked, and its influence upon our enemies is considerable. If these Tirah hill-men had found that every time they showed

their heads they were shot by our men, the effect upon them would have been very much like that which the good shooting of the Boers had upon our men. The next point I should like to emphasise is what the lecturer has said with regard to inspections. As he is a general officer we may be sure that he knows perfectly well what he is saying; he has gone through it all as subaltern, captain, and field officer. The subject of inspections is always a difficulty, not only in our Army but in foreign Armies. That has been brought out in the German Army, as most of us know, in the "Letters on Infantry," by Prince Kraft. I am not going to quote the passage, but he told us the way in which he conducted his inspections, and that he very much objected to the cut-and-dried way in which inspections were generally made. He thought out the matter thoroughly himself, and knew perfectly well what he was going to do, but he never let it be known by the regiment he was going to inspect until he came on the ground. There is no doubt that the suggestion of the lecturer, that a corps being inspected should be taken up into hilly country with some troops to personate the enemy, is a very valuable one. They have been doing that at Attock, I think in March this year. Some of the Indian troops were sent forward to personate the enemy, and no doubt the practice had good results. The lecturer says that no additions are required to our Drill-Book. I think that a great many officers would not quite agree with that. I think there is a very strong feeling in our Army, especially in India, that certain instructions—not to replace those of the Drill-Book, but in addition to them—might well be laid down with regard to hill-fighting. Some officers who have had great experience in Tirah have written about it, and they seem to think that retirements should be practised in a most systematic way, and rather differently from what is laid down. I am rather surprised that the gallant lecturer has not said anything with regard to *scouts*. Most of us, I dare say, have read that very excellent article on the "Gourka Scouts," in *Blackwood's Magazine*, and I would like to ask the lecturer whether he is not in favour of scouts being specially trained—whether it would not be advisable to have four men in every company specially trained as scouts, men specially selected for the purpose, marksmen, and in every way fit for their work. It is well known that all our losses in the Tirah campaign took place during retirements. The Gourka scouts were trained to hold the ground up to the last moment, and then to rapidly run through the firing line already withdrawn, which by that time had taken up a position in rear. I think that if some instruction as to this and some other points was very shortly given in the Drill-Book as things which should be practised, it would be a valuable addition to the book. There are some other points with regard to which I venture, with very great deference, to differ from the lecturer. I do not think it would be practicable or that any good would come of firing in movement. The French practise it regularly, and the Germans have lately made very exhaustive trials to find out whether it could advantageously be done. They have come to the conclusion that not only does the attacking party by firing in movement not score as well as by the usual method of firing, but that the men thus halting, even momentarily, to fire suffer more, and that it is extremely fatiguing. I hope that firing in movement will not be practised. It has never been sanctioned in the British Army. I think that too much stress cannot be laid on the principle of holding on to a position that has once been taken, if possible. Of course I would not presume to criticise for a moment operations which took place at Dargai. As General Gatacre has pointed out, there may have been very good reasons for giving up the position seized on the 18th, which had to be retaken at great loss on the 20th. That may have been connected with what he said on the subject of rations. Here I venture again most humbly to differ from what the lecturer has said. He does not think it is possible to give troops cooked rations to carry with them. I can only say that we always did it in Afghanistan. Sir Donald Stewart and Lord Roberts, who are most experienced commanders, and who have done a great deal of hill-fighting, insisted that one day's cooked rations

should be always carried when any fighting was about to take place, and when time of return to camp is uncertain. It was done on the day of the battle of Kandahar. Of course there may be other means, in these days of scientific chemistry, by which, instead of what is commonly known as cooked meat rations some other equally efficient ration may be substituted; but, I do think our troops going on hill expeditions should never be allowed to go without one good day's rations in their haversacks. I think the weight of an extra pound or so would be nothing compared with the men having a meal in the day. Even if the men have beef and tea in the morning, they would be starved out by the end of the day. Therefore, in some form or other, I think a day's cooked rations should be carried by every soldier when there is fighting likely to take place. The lecturer has mentioned one or two points with regard to equipment. I think if he would use his influence with the War Office to induce them to provide a lighter great coat than our men have at present, he would deserve well of his country. I should like to ask him if he would also tell us whether he is aware of the experiments that have taken place at Khandala to find out the difference in elevation required in firing uphill and downhill. Major C. B. Mayne, whose name is well known to this Institution as an authority on fire tactics, has reported these experiments in the *Royal Engineer Journal*. He has reduced them to a very simple rule with regard to firing at certain elevations. I do not know whether it might be well to carry on some such practice in the field-firing in India. Another point which I think has not been touched upon is: should not men be trained to carry the wounded out of fire? According to all accounts of recent campaigns, the great danger was men clustering round the wounded in large groups. Should not they be taught that no more than two men should ever be required to carry a wounded man? I am quite aware that that is subject to what they have to carry; and there again I think the old-fashioned ancient dooly is an abomination. We were favoured with a lecture by Colonel Carter in this Institution on "Hill-Fighting," and he showed us an excellent kind of hammock, which can be carried by two men, and that, with a light cover, I think would be found very efficient and practicable. I should like also to ask if the lecturer can give us one or two words in his reply with regard to the use of mountain guns and machine guns, which would make the lecture even more valuable than it is at present.

Dr. MILLER MAGUIRE:—I rise, as a mere theoretical student of the art of war, to express my very high admiration for the perfect encyclopædia of hints and facts with regard to mountain warfare which have been set before us in so short a time; and I can do so the more freely, and express my admiration the more clearly, because nobody could possibly have a stronger constitutional antipathy to taking part in any operations of the kind than myself. The gallant general delights to fight among rugged mountains. For my part I do not care even to walk among them. It appears to me that my view is held by no less a distinguished authority than the gentleman who draws up the course for the Staff College, because in drawing up a programme recently for the most distinguished young students in the British Army, he set before them the campaigns of the English in the Peninsula, and brought them straight up to the foot of the Pyrenees on July 25th, 1813, and there he stopped—just as I also would have stopped under circumstances of real war if I could have done so. I was once induced by a gallant officer in this room to study the art of war amongst the fastnesses of Switzerland. Being merely a theoretician I very soon tired of it, and I made a vow as I was ascending the Furba Pass, before finding my way over the Devil's Bridge, that if I could once again get into the plains of Lombardy not even the exploits of Suvarrov and Lecourbe would induce me ever again to ascend those hills. Therefore, with the most cordial goodwill, I express my admiration for the exploits in which the general has taken part. But if I were teaching practical soldiers I would suggest that a study of mountain warfare in the past might be a prelude to the success of mountain warfare in the future,

and I think you will agree with me that the operations of the British in the Pyrenees for several weeks, against such an able officer as Marshal Soult, are well worthy the study of every young Englishman, and especially of young gentlemen who propose to fight in the terrible solitudes and rugged valleys and by the precipices to which the lecturer has referred. Again, it cannot fail to be interesting to young would-be officers to study such brilliant operations as those of the French Prince de Rohan in the heart of the Alps in the middle of the seventeenth century; or, again, such operations as the movement from Villeneuve to Aosta over the St. Bernard by Napoleon; or the far more magnificent operations of Macdonald in the Splugen Pass and the neighbouring mountains. I think the study of these events would lead modern soldiers to try to emulate in their own lives the actions of their predecessors. I was much struck with one remark of the lecturer in regard to rest. He suggested resting by lying down as well as sitting down. That happened to be the advice of the Confederate General Stonewall Jackson, who said that when a man lies down he rests all round, as it were. For me to intrude further on the audience would be an impertinence. I merely rise as a *quasi*-soldier, a civilian soldier, and a mere theorist, and a person who proposes never to indulge in any hill warfare of any kind if he can possibly avoid it, and who is quite content to spend his life in the placid and fertile valley of the Thames, to express how much we are indebted to the lecturer, and how much we ought to be proud of our soldiers who, emulating the veterans of Alexander the Great, have recently operated near the "Roof of the World"; and especially how proud we should be of such experiences as those of General Gatacre, which have resulted in the very able lecture to which we have just listened.

Lieut.-Colonel F. C. CARTER (Commanding 1st Bn. Royal Berkshire Regiment): — This is such a very important subject that I venture to think some of the points which Sir William Gatacre has brought forward will not suffer by being rubbed in a little further. Some of us, mostly junior officers, I think have, both in this theatre and in India, for several years past been at this subject of training for mountain warfare, but to the best of my recollection this is the very first time that "hill-fighting" on the borders of our great Eastern Empire has received its due at the hands of a modern major-general. We are all rejoiced to think that an officer of General Gatacre's experience and standing should himself bring it forward here in a lecture, and the result we hope may be profitable to the Army at large. General Gatacre in one of his remarks said, "I think it is the application of practical experience to the present Drill-Book, rather than the introduction of any new form of movement, that is required." If my memory fails me not, it was in 1893, in an essay I wrote, and again in 1895, in a lecture in this theatre—the Chairman will, I think, bear me out—that I made very similar remarks; but, I added that although I considered no new forms of drill were required, and that our present Drill-Book was sufficient for all purposes, I did consider that it would be most useful, and moreover was, I thought, very necessary, that an addition to the Drill-Book should be made in the form of certain precepts, rules, and hints as to the proper conducting of warfare on the frontiers of India, on similar lines to those which we have just heard from Sir William Gatacre, the one page of notes on Savage Warfare now in the Drill-Book not meeting the requirements of the case. If you will bear in mind that a very large percentage of our officers, not only junior officers but many of them senior, and some in very responsible positions, smell powder and gain that "practical experience" for the first time on our Indian frontiers, you will see what I mean when I say that I consider it is in no small measure due to the lack of any systematic training and instruction in peace-time in the requirements of modern Asiatic warfare, that very often valuable lives are lost at the commencement of a campaign in the gaining of this practical experience, which General Gatacre tells us is

so necessary for putting the Drill-Book in practice. I am entirely at one with the lecturer when he says we require no new forms, and that our Drill-Book is sufficient. I consider it is. If the Drill-Book is only read with an open mind, and a fair amount of common sense, it meets all purposes. In my opinion—which I think is shared by a very great many officers nowadays—it contains the best condensed essay on modern tactics which has yet appeared in any language. If such hints as those which the lecturer has given us were embodied, they would not take up more than 20 pages at the outside. There are at least 100 most important points which the lecturer has brought forward, and which would be found most useful, not only to experienced officers but to two other classes of officers—the young and inexperienced officers who look to their Drill-Books as a guide. They go through their first training with their company, and they work on the Drill-Book. Is there anything in the drill tactics or syllabus to tell them of these points? Nothing. It is to these officers and their men to whom it would be most useful as a guide to the most probable warfare they will be called on to take part in. It would be most useful to another class of officer, and these are not always junior officers—I allude to those who are too prone to find fault with the Drill-Book, men who seem to have a natural aptitude for reading the Drill-Book upside down; men who cannot conceive of any application of the drill except to the ordinary stereotyped English field-day. I am very glad to hear Sir William Gatacre lay such stress on the responsibility of company commanders. I know that decentralisation is a great point of his. It is with me, too; without it we can run nothing really well in the British infantry. It is being gradually understood now, but it has not been in past years, and on this question of decentralisation the Indian services have a great deal the better of us. A very distinguished officer who was in India a short time back told me that nothing struck him so much as the independence and the capability of young subalterns in the Staff Corps. That perfectly true, and those of us who have served in India have seen the cause of it. The young officers are put in responsible positions and *encouraged* to act for themselves; responsibility is thrown upon them, and they accept it willingly. The result is that they grow up capable and self-confident, and if they find themselves suddenly in command of a regiment on service, as a subaltern did the other day, they are all there. We in the British service are at a disadvantage. The practice of over-centralisation is now dying out, but slowly; for the last 25 years officers have been tied by apron strings, as it were. They are seldom allowed to have an opinion until they are "grey-beards," and then after years of dependence, when let loose they are naturally untrained to the responsibility. On the subject of field rations, it has always struck me, when we have carried two or three days' rations with us, that the ration biscuit is the most unpalatable thing I have ever put to my lips. In 1897, when quartered at our depôt at Reading, I discussed the question with a member of the firm of Messrs. Huntley and Palmer, and expressed an opinion that a very good thing would be a sort of glorified dog biscuit—something with meat in it, which would not go bad and not be so hard that it cannot be eaten—a biscuit that a man could carry for a week or more in his haversack and find that it was still palatable and fit to eat. One of the members of the firm made me some biscuits of this sort, and I think they were a success. I took for testing purposes two of them to South Africa with me, and kept them in a cardboard box. At the end of a year we found they were very good. I think if we could get something of this sort it would be a very good thing. This, of course, does not affect the question of the "iron ration." What General Gatacre said we chiefly wanted was a training ground suitable for training our officers and men at home to mountain warfare. We all agree with him that what we want is suitable training ground, but what we *chiefly* want—I hope I shall not get myself disliked in what I am going to say—what I think we chiefly want is officers who will appreciate what can be done in the way of training officers and non-commissioned officers to hill-warfare

with the existing training grounds that we have. In the neighbourhood round about Aldershot there is a lot of ground where proper training in semi-civilised and savage wood and mountain warfare could be carried on. I cannot remember having heard of or seen—I have certainly never taken part in such a thing—as a brigade or divisional field-day at Aldershot where the enemy, skeleton or otherwise, was supposed to represent anything but the Army of a modern European friendly State. Savage warfare and the training for it is practically ignored. Our Drill-Book gives us one page—section 123, I think—on the subject of savage warfare, which refers only to the Soudan. Asiatic warfare is not mentioned. Our Staff College course hardly treats of Asiatic warfare at all. There is very little training at Camberley, or elsewhere in England, for a coming general who may suddenly find himself commanding a force across the Indus. There is hardly any training in Camberley for the staffing of an army in the field in the Himalayas, and the staffing of an army in the field in the Himalayas is a very different thing from the staffing of an army in the battle-fields of Europe. One would think that the British Army was every year engaged in fighting nothing but European foes. It is, however, very nearly half a century since we fought in Europe; whilst every day along the marches of our vast Empire the British soldier and his dusky companion in arms is fighting across mountains and deserts and through jungles and swamps, and it is training for that kind of fighting which we want for Tommy Atkins and his officers, as well as for our native troops. As it is now, British soldiers only get that training in India; it is, I would submit, neglected in our Home commands, yet people are surprised when war breaks out that the British officer and soldier are not so thoroughly well trained in mountain warfare as their native brethren in arms. I think our native troops have the advantage, and we of the British Service the disadvantage, when it comes to real fighting.

Surgeon-Major W. C. BEEVOR (1st Bn. Scots Guards):—There are three points in this lecture on which I should like to say a few words. I will not detain you long, after the many interesting speeches that have been made, but with regard to the question of rations I quite agree with General Gatacre that it is impossible to carry cooked rations in a soldier's kit. It is also, in hill-fighting, undoubtedly impossible to carry it for him. I had the honour and the pleasure of serving in the Tirah campaign, and I there observed that it was absolutely out of the question to take any men in the position of orderlies or carriers. It was too much for us to take men to look after the wounded, with an enemy which shot as the Afridis did. It was a source of great trouble and a cause of much disaster and loss of life, having to take men who could attend to the wounded and carry them down the hill. The question of these rations, I maintain, is a very important one. I went on several outlying piquets in this campaign, and remained several times with the men all night without any food or water. You will say at once, of course, "Why was this not avoided?" It was impossible to avoid it with the equipment with which we are at present provided. But I beg to announce that I think in a short time the British soldier will be provided with a ration which will enable him to be independent of his base for several hours. We have already completed several methods of drying foods. We had in the Tirah campaign in our hospitals various experimental tablets. The most useful one is called the pea-soup tablet. Many and many a time we were supplied with these pea-soup tablets, and they were quite sufficient for the men to feel fairly vigorous for several hours. One expression which they almost invariably used, in the very cold and frosty mornings, was "My word, sir, it is nice as it trickles down." We have already got dried foods which I trust we shall be able to supply the soldiers with in a few months' time and enable them, with about half a pound weight in their pockets, to remain for thirty-six hours without hunger and without exhaustion from want of food. I had the pleasure of meeting in a London club not long ago. Mr. Gye, of the Naval and Military Club, who knew that I was interested in the supply of food to the soldier, and sent me some samples from a

process which he has invented for drying meat, potatoes, eggs, and various kinds of vegetables. I have experimented with them, and severa other officers of the Brigade of Guards, to which I belong, are experimenting. We are trying them not only with the soldiers but on our, perhaps, unfortunate private friends, because we gave them omelettes and various little dainty dishes which we made out of what I hope will soon be provided for the British soldier to eat. I must say Mr. Gye's process has so far exceeded in excellence any of the foods which I bought myself from Messrs. Fortnam and Mason and took on two or three expeditions, and I think there is a great future for it. There is one thing which the British soldier will be able to have, which he cannot do without, and that is vegetables. There is no doubt if you can supply a British soldier with a certain amount of onions and tomatoes, he will not want many more vegetables. Of course, with regard to hospitals, that will not concern you particularly as fighting-men, but we have already completed a process now for pulverising milk. The want of milk in many of our camps has, I maintain, been a very serious matter. Nothing is more disagreeable than that nasty mawkish sweet stuff which they give to the sick, and call condensed milk. I think many a man's life might have been saved instead of lost if he could have been properly supplied with milk and eggs, and that is impossible unless you can reduce the bulk of these food stuffs. I can announce that that has been done, and we are trying now to get the War Office authorities to take this matter up. With regard to the question of training men to carry the wounded down the hills, Colonel Gunter has very wisely remarked that it is necessary to have certain men trained in every force in the methods of carrying the wounded away from the fighting line, but I beg humbly to differ from Colonel Gunter in one respect, and that is with regard to the number of men that shall be trained. He says at least two in each company. I do not think two men per company, as mentioned by Colonel Gunter, would be sufficient.

Lieut.-Colonel GUNTER :—Pardon my interrupting, I said two men per *stretcher*.

Surgeon-Major BEEVOR :—I beg to maintain that every man who accompanies a force in all kinds of fighting, but particularly in hill-fighting, should be trained to carry his wounded comrades. I had many an instance in Tirah where acts of untold gallantry were done by men unfortunately ignorant of the proper method of carrying the wounded. I saw men, and helped some of them sometimes, poor fellows, who were trying to carry their comrades down and up hills as well, and utterly ignorant as to how to do it. It is needless for me to go into the details of it here—there is no time; but there is one mistake which you will find the British soldier makes, and I suppose most people the same, that is in supposing you can carry a man in your arms in front. None of you can do anything of the sort. I am fairly strong and physically developed and so on, and I can carry most men, and have been versed in it for many years, and yet I cannot carry a wounded man, and particularly a dead man, when he is limp, for more than a very few yards in my arms. For 100 yards it is useless. The way to carry a wounded man is to have his weight superimposed on your back. However, I will not go into those details. I wish to draw the attention of the lecturer to this matter, and ask him if he can help to bring the matter forward with regard to the better training of all soldiers in helping their wounded comrades. In the Brigade of Guards I beg to state there is not one single man in my regiment who is not trained, during his military training, by myself and by the junior medical officers, into the methods of first aid to the wounded. The men take a very great interest in it. I do not go into any details of drill and that sort of thing. Common sense and a blackboard are all that are required. With regard to the advisability of a lighter great-coat, I beg most humbly to differ. We have been served out with great-coats lately of very excellent pattern, and most comfortable to wear. The one point which the men seem to complain of is that their great-coats are not heavy enough. It may be wrong, but that is the men's opinion. In several instances—I think you will bear me out, Sir—on the hills in Tirah, the cold was so intense that the

blankets were not sufficient. I well remember after the battle of Dargai when the wounded were brought down from the hill and collected in a small space, five blankets were not sufficient to keep a man warm—several had five blankets; but there was a difficulty in getting the mules up the hill, and five blankets were not sufficient to keep them warm. When a man has lost blood he naturally feels the cold, and I humbly maintain that it is well to have as good a material and as close woven a material as possible for the great-coat.

Sir WILLIAM GATACRE, in reply, said:—I will endeavour to reply shortly to a few of those criticisms which appear to me to be excellent on the hints I have put forward. I quite agree with Colonel Gunter's remarks as to the necessity of individual firing, and I intended to convey in my paper that I looked upon individual firing and collective firing as equally important. One without the other is no good. There have been critics who have pitted one against the other, but I am entirely in favour of both being brought to the greatest state of perfection that is possible. In hill-fighting, where you only see a man's head for a second, you cannot get a volley into it; but a marksman, who is a really good shot, may do so. I intended to convey that in my paper. I think Colonel Gunter hinted that it would be better for general inspections to be surprise visits. I am not sure that you get much greater efficiency in that way. I think if officers and men are good—bad men are no good to us—they will carry out the thing conscientiously and to the very best of their ability, if they know exactly what you want done. Of course one does know instances. I remember hearing of an officer who came across a sentry at one of the piquets in the Soudan, and went up and asked him suddenly what his orders were, and the man's reply was that his orders were to let the officer in command of the piquet know "when the General was coming." Apparently those were all his orders. Of course that is the sort of officer who looks for surprise visits. I am not in favour of that. I think you should make everybody understand that he is working for the Queen and not for any particular general officer, or anything of that sort. Everyone should be made to understand that they ought to do their very best, and I feel quite sure that our officers will do so. If they do not, the general officer, if he is sharp enough, can generally see at his inspection whether the men know their work, or whether the thing has been worked up for the occasion. Of course working up a unit for any particular event or occasion is the worst form of instruction we can have. With regard to scouts (four or five men in a company, or whatever may be advocated), I think every man in a company should be a good scout. Of course one reads in the Drill-Book that the scout should be selected only for good eyesight and keen ears, and so on; but as a matter of fact you cannot find those four or five men always, and if you do you generally find they are on some other duty—they are on transport or in hospital, or on this, that, and the other duty. And so, I think we can only arrive at a general standard. Of course if you can get the men so much the better, but I think every officer should so train his company that they should be good enough; that is really the point. If you can get a company of scouts out of a battalion it is a good thing, but it is rather invidious I think, and I think every company should be able to take care of itself or the whole battalion. It is a point of course, but I should not like to pin my faith upon it altogether. I am more inclined to say: make every regiment look after itself in the same way as you make every brigade in a division look after itself and be responsible for its outposts and everything else. I think every company and every regiment must do the same. With regard to firing in movement, I think Colonel Gunter is quite right—it is not a very useful exercise. I intended to convey in my lecture that you do not get much out of it, but there are occasions when it is useful. In that first fight at Atbara we had to advance over quite a level slope—as level as a table. Our opponents were in a trench. They had a stockade in front of them, and could go on firing at us as long as they pleased. We had not a blade of grass between us and them, and the only thing was to make those men duck their heads

so that when they did fire they fired up in the air. Possibly, if Colonel Glen had been there they might have hit him, but I do not think they would have hit anyone under 7 feet high! If you were about that height they might hit the top of your head. That firing at Atbara was a very valuable thing to us. We only lost 114 men in casualties and they were knocked over going down the slope; I am quite sure if we had not trained our men to fire as they went, and so disturbed the enemy's aim, we should have lost a great many more. As I said in my paper, I do not believe in it as a means of killing; but, it is a very useful thing to disturb the enemy's aim. If you can make a man bob his head when he is shooting at you, then it may be extremely valuable to you. With reference to cooked rations, I think there is a slight misconception. I did not intend to say that the men should not carry in their haversacks the emergency ration. That is quite a different thing. The emergency ration is a double ration, half of it being pemmican—that is, pressed dried meat, and the other half chocolate. These two edibles are put in separate light tin cases, and joined together. Then, when you tear off the central band you get one cake of pemmican and one of chocolate; they are quite invaluable. Whenever you go into action it is laid down that you carry one. That is in our regulations now. I did not refer to this emergency ration at all. But it is when you are marching day by day that the men require a meal before they start. If they get that, they will get to the end of their ten miles' march under the sun all right. But it is when the men are on outposts, and so on, and only get a cup of tea, that they suffer so much. With regard to the emergency ration, you would never dream of moving men off without having that with them. Though the emergency ration is a most valuable thing, it does not do to live on it too long. Bulk you must have to keep men fit; but the emergency ration is a most valuable thing for one day's performance. If Colonel Carter can produce a good biscuit, all well and good; but I think that a dog biscuit, or whatever it is, is a very good thing—for a dog; but I am not sure about it for men. The men's teeth will not stand these things, and when the biscuits are as hard as iron, it is very difficult to get men to eat them. They will break them, and finally break their teeth, and throw the biscuit away. You cannot get hot water to soak biscuits in. I remember in Chitral we lost one or two men from biscuits that were in tins. I do not remember the name of the maker, and I would not tell you if I did, because I might be liable to an action for libel. These biscuits, directly they were opened, went bad, they turned blue on the top. On our referring it to the maker he said that it was their nature. Whatever their nature was, I remember the medical officers told us that under no circumstances would they allow the men to eat them, and we struck them off the list the next day. As to a lighter great-coat, I think if we could get the necessary good material to make it with, it would be quite excellent, but when you pay 18s. 4d. for a great-coat—and that is rather a high price—you cannot get the necessary fineness of wool and close texture. It cannot be made for the money. Until the Government pay a great deal more—and they cannot afford to pay very high prices—for garments, we shall have to be content with the present great-coat. A thin great-coat of poor material is no good, we must have a thick one, so that there is something between the man and the wind. That is my belief. With regard to Major Maine's treatise on firing, I have not gone into that question thoroughly. I have heard of it, but I cannot express an opinion upon it. But I feel sure on one thing: that whatever Major Maine takes up he is sure to take up practically, and to work it out thoroughly. It is a thing to turn one's attention to. With reference to mountain guns and Maxims, I do not know what one can say on the moment about their use, except that mountain guns should always be used in a battery, and Maxims should never be used in a battery. A Maxim gun should always be with its unit—that is with its regiment—so that it can be turned on to any particular place or pass to cover the line of route or advance. That is really the use of the Maxim gun, to turn it on to some point where it can do the work of

twenty rifles. It is a very valuable machine, there is no doubt about that. I do not think there is anything else that I can say now. I have a great deal at the back of my head, but I cannot get it out.

The CHAIRMAN (General Sir John J. Hood Gordon):—We have to thank General Sir William Gatacre for his very interesting and valuable paper on hill-fighting in India, and also those who spoke in the discussion. Major Beevor has given us gratifying intelligence regarding a portable ration for the soldier, a necessary adjunct to hill-fighting, so much wanted for troops operating in roadless regions. He is fresh from the recent campaign in Tirah, and has applied his experience to some purpose. The subject of the paper we have just heard read is a most important one. Hill-fighting has almost, I may say, become a hardy annual in the British Army garden. The more we can hear of it here, described and discussed by those who know it, and the more our young officers can study and criticise it even, the better. During the last half century we have had constantly recurring experience in hill-fighting on the north-west frontier of India, the last experience being the most important of all. I would suggest to Sir William Gatacre or Lieut.-Colonel Carter to draw up a condensed account of the mountain campaigns there in the last ten years. They are worthy of the study of all officers. No doubt the best of all military education is active service. A distinguished Peninsular officer, when asked what was the best mode of learning the art of war, replied, "Fighting, and as much of it as possible"; but there is also much to be learned in study—in the study of theory formulated upon practical experience of others in the field, and it is very advantageous to young officers if properly put before them. To them I would say read a little regarding mountain campaigns—those of Chitral and Tirah, for instance—and think a good deal over them. It will be of great use to them in instructing and leading their men, and in forming plans for instant action when it comes to their turn to act in such regions. Sir William Gatacre has truly said that the principles laid down in our Drill-Book are sufficient for all our purposes. I believe thoroughly in our Drill-Book. Its principles, when properly applied, suffice for the world-wide field which the British Army is constantly called on to act in. We do not require forms or rules; principles are the only guide in war, and we must fit them to the locality and the enemy. We must study our enemy and his country. Each tribe, each clan, has its characteristics and special tactics, and a knowledge of these is half the battle. Take the last mountain campaign—that in Tirah for instance. That country is one vast military obstacle, both in its physical nature and in that of its people. The Afridis had a sublime confidence in the great natural strength of their mountainous country, and in their own straight-shooting rifles; but good generalship, based on experience, practical knowledge and study, backed by a well-led resolute army successfully overcame all difficulties—difficulties which, perhaps, were not fully understood by distant critics, who whenever a detachment here and there, ignoring principles, suffered in consequence, were too apt to condemn the plan of campaign. A friend of mine while travelling in the Caucasus during the time of the Tirah campaign met a Russian general, who remarked to him, regarding our operations there, that some of the English newspapers criticised the campaign without practical knowledge, fretted at delay and mishaps, and expected too much to be done in a short time; that our experience in Tirah was precisely theirs in the Caucasus, easy enough to get to the objective, but very difficult to safely withdraw; safe enough when on the sky-line of the mountains, but perils awaiting them when descending. The Afridis retired as our troops advanced, only to follow up rapidly and cleverly as we withdrew. They studied us, watched for any false move, and swooped down on any detachment which got entangled in the ravines. These strong, active mountaineers who inhabit the mountains on the north-west frontier of India, are foemen worthy of our steel—well armed, inured to war, animated with hereditary courage, and with an excellent notion of individual fire discipline. Fighting

against them demands effort and skill of no mean order, and call forth all the best qualities of our soldiers. They have been fighting against us off and on for about fifty years. When we first met they were as well armed as we were, perhaps better. They had their small-bore matchlocks and sharp swords, to our smooth-bore muskets and bayonets. When we introduced the rifle they did the same, and followed up with the breech-loader. To-day they are armed with Martinis and Lee-Metfords, and scorn the Enfield and Snider as quite unfit for the first-class fighting-man. In the face of such a brave, well-armed enemy, progressing in the art of war, it is more than ever necessary that our officers should study mountain warfare, for the conquering of Pathan highlanders is a much harder task than the over-running of their rugged country. This lecture we have heard to-day goes far in this direction, and is a valuable aid to the study of the subject. I am sure that you will all join with me in passing a hearty vote of thanks to General Sir William Gatacre for the excellent lecture he has given us.

VON LÖBELL'S ANNUAL REPORTS ON THE CHANGES AND PROGRESS IN MILITARY MATTERS. JUBILEE NUMBER. REVIEW OF THE DEVELOPMENT BETWEEN 1874 AND 1898.

Précis by Major-General H. J. T. HILDYARD, C.B.,
Commanding 3rd Infantry Brigade, Aldershot.

THE present year marks the issue of the twenty-fifth volume of the valuable military publication originated by the late Colonel von Löbell. The event has been appropriately celebrated by its present director, Lieut.-General von Pelet-Narbonne, by the publication of a jubilee number, in two volumes, forming together a valuable and exhaustive review of the progress made by the Armies of individual States in their strength, organisation, equipment, and training; and of the development effected in tactics, armaments, and fortifications since the close of the Franco-German war of 1870-71.

This work is in itself an education in regard to the military development of Armies during the last quarter of the nineteenth century, and it will take its place as a valuable book of reference respecting the tendencies of the tactics of the several arms and of military science generally.

Our thanks are due to the distinguished officer who has originated and so ably presided over this jubilee publication not only for its contents, but also for its appearance printed in the ordinary character, which is a welcome change from former issues.

The arrangement is the same as in former years, one of the two volumes being allotted to the consideration of the changes effected in the Armies of individual States, while the other deals with tactics, armaments, fortifications, and auxiliary services. An able introduction by Lieut.-General von Pelet-Narbonne is appended.

The present *précis* is confined to the first volume only, and it is necessarily inadequate to do more than call attention to the very thorough and complete review of a quarter of a century's progress in military matters, contained in it. H. H.

CHANGES EFFECTED IN INDIVIDUAL STATES.

GERMANY.—1874-98.

From the following tables the augmentation to the Army in units and peace strength during the twenty-five years under consideration is clearly shown. Excepting in the cavalry, the number of squadrons in which remains unchanged, a substantial increase in units is apparent in every arm of the Service.

The number of army corps was in 1890 increased by 2; and 155 battalions of infantry, 194 batteries of field artillery, 75 companies of foot artillery, 25 companies of pioneers, 22 companies of train, 24 companies of railway troops, and 2 balloon sections were added to the Army between 1874 and 1898.

The consequent increase to the peace establishments of the combatant troops has been 5,963 officers, 155,777 other ranks, 16,696 horses, 1,342 horsed guns, and 97 horsed ammunition wagons.

The following tables show the detail and progressive increase:—

Distribution in Peace.

Year	Army Corps	Divisions	Infantry			Cavalry			Field Art.			Foot Art.			Pioneers.		Train	Railway troops		
			Regiments	Battalions	Companies	Regiments	Squadrons	Detachments of mounted Jägers	Regiments	Divisions	Batteries	Regiments	Battalions	Companies	Battalions	Companies	Companies	Regiments	Battalions	Companies
1874...	18	37 Inf. 4 Cav.	148	469	1876	93	465	—	36	88	300	13	28	74	18	72	41	—	1	4
1881...	18	38 Inf. 3 Cav.	159	503	2012	93	465	—	36	88	340	15	30	120	19	76	43	1	4	16
1893...	20 (form'd in 1890)	43 Inf. 1 Cav.	173	3 and 173 ½-bns.	2676	93	465	—	43	173	494	17	37	149	23	97	63	3	7	28
1898...	20	43 Int. 1 Cav.	213	624	2496	93	465	7	43	173	494	17	37	149	23	97	63	3	7	28

2 balloon sections have also been furnished from the railway troops since 1893.

Peace Establishments.

Year	Officers	Other ranks	Horses	Horsed guns	Horsed ammunition wagons
1874	17,213	401,659	81,342	1,200	—
1881	18,128	427,274	81,629	1,360	—
1893	18,699	528,167	95,794	2,542	97
1897	18,944	526,079	96,661	2,542	97
1898	23,176	557,436	98,038	2,542	97

With the exception of those recorded for 1898, non-combatants are not included in the numbers.

The reasons for so large an increase to the armed forces of Germany are to be found partly in the increasing numbers of the population, which

has augmented constantly those becoming liable to service annually. Another reason, however, was the continuous increase in the Armies of France and Russia—States which are on intimate terms with each other.

In spite of its close alliance with Austria and Italy, it seemed, therefore, advisable for the German Empire to develop to the utmost its powers of defence; so as to be in a position to hold its own in view of all possible eventualities of a quite uncertain future.

BELGIUM.

During the Franco-German war of 1870-71, a Belgian army of observation consisting of 2 army corps was placed on the frontier, and a combined division mobilised for the defence of the fortified camp of Antwerp. The numbers available in 1870 were limited to 44,866 men with the colours and 49,799 reserve men.

The mobilisation of these forces brought to light the imperfections of the then existing organisation; but it was not until 1885 that a re-organisation was effected. By this the available forces were grouped under three heads:—1. An army of observation composed of 2 army corps, each consisting of 2 army divisions, 1 reserve cavalry division, and certain auxiliary services 2. A combined division for Antwerp. 3. Fortress troops composed of non-active battalions.

This organisation had the following serious defects: the independent cavalry was not sufficiently strong, the Army was divided into only 2 great tactical units (army corps); and the fortress troops were inadequate, both as regards strength and organisation.

In 1892 the still existing organisation was introduced, with a view to remedying these defects. By it the forces are divided into a field army, fortress troops for the mobile defence of the principal fortified places, and Ersatz troops.

The field army consists in war of 4 army divisions and 2 cavalry divisions. Each army division is composed of 2 infantry brigades, containing together 12 Line battalions and 1 rifle battalion, 2 squadrons, 7 to 8 batteries of field artillery, an engineer company and a train company. A proportion of the auxiliary services also forms part of each division.

The 2 cavalry divisions comprise each 2 brigades, together 16 squadrons, and 2 horse batteries, with auxiliary services.

The fortress troops consist of 3 battalions and 2 squadrons of the Active Army each at Liege and Namur, a 5th Division composed entirely of reserve troops for Antwerp, and 30 reserve battalions, 4 fortress artillery regiments, and 12 engineer companies.

The Ersatz troops are composed of 19 infantry, 8 cavalry, 4 field artillery, 4 fortress artillery detachments, 1 train and 1 engineer detachment.

The numbers of the Active Army serving with the colours in peace have not been materially increased by these several re-organisations. In 1870 there were 44,866 men; in 1880, 43,007; and in 1895, 48,165.

But, on the other hand, the number of reserve and non-active troops liable to be called up rose from 49,799 in 1870 to 115,981 in 1895.

From these statistics it would appear that the total paper number of men available on mobilisation from all sources should be above 164,000. But from that number deductions must be made, and it is probable the present war strength of the Belgian Army is at most 140,000 men.

The following conversions of peace formations take place on mobilisation :—

Infantry.—The regiments are doubled, the 3 active battalions form an active regiment, the 2 reserve battalions a reserve regiment. The 4 active battalions of the rifles are allotted to the 4 army divisions, the 3 reserve battalions form a reserve regiment. The reserve regiments form a number of brigades, of which 2 form the Antwerp mobile division.

Cavalry.—The 4 first squadrons of regiments form the regiments of the independent cavalry. The 5th squadrons are allotted as divisional cavalry, 2 to each army division. Lastly, each regiment forms a 6th squadron, for allotment to the fortresses.

Field Artillery.—Each regiment forms with its active batteries the artillery of 1 division. The reserve field batteries are allotted to the fortresses. The remaining reserve batteries serve to horse the ammunition columns.

Bulgaria and East Roumelia.

At the close of the 1877-78 war, the volunteer formations in Bulgaria numbered scarcely 6,000 men. Already in the spring of 1878 the Militia formed by Russia amounted to 29,600 men ; but this was not a peace strength. Later, in 1880, after the Berlin Treaty, the peace strength was as follows :—East Roumelian Militia, 8,003 men, or barely $\frac{1}{2}$ per cent. of the population. Bulgarian Army, 14,470 men, or about $\frac{3}{4}$ per cent.

After the amalgamation of the two States in 1868, the peace strength rose to 29,204 ; and in 1896, in a period of ten years, it had increased by 10,000 men.

In 1898, the numbers, taken for the budget, were 2,478 officers and officials, and 41,609 men, or about $1\frac{1}{3}$ per cent. of the population.

The existing peace organisation of the Army is based on the law of 1891. Under this, there are 6 divisions, the headquarters of which are at Sofia, Philippopel, Slivno, Schumla, Rustschuk, and Wratza.

Each division consists of the following :—

Infantry.—4 active regiments, each of 4 battalions; 4 reserve regiments of 3 companies which are attached to their corresponding active regiments ; and 1 independent frontier battalion. The total number of companies in every division, except the 4th, is $48\frac{1}{2}$; the 4th has 1 garrison battalion in addition, making in all $55\frac{1}{2}$ companies.

Cavalry.—1 regiment of 4 squadrons ; there is a body-guard squadron in addition with the 1st Division, and the regiment has 5 squadrons, as has also that with the 2nd Division. The 5th Division has no cavalry ; but a regiment is to be formed from the 5th squadrons now with the 1st and 2nd Divisions.

Artillery.—1 regiment of 3 brigades = 9 field batteries.

The 1st, 2nd, and 3rd Divisions have also a brigade of 3 batteries mountain artillery. The 1st, 4th, and 6th Divisions have each 1 battalion of 5 companies garrison artillery, and 2 howitzer batteries (the 1st Division has only 1).

The 1st, 4th, and 5th Divisions have a pioneer battalion of 4 companies. The 1st Division has 1 railway and 1 telegraph company; the 5th Division, 1 pontoon company.

The war strength (rationed strength), 1898, of the Army is the following:—

	Officers and Men.	Horses.	Vehicles.
Active Army -	129,378	20,484	1,755
Reserve Army -	70,000	11,000	1,400
Popular Levy -	24,960 to 39,360		

There should be available for the combatant portion:—

	Rifles.	Sabres.	Field Guns.	Mountain Guns.
Active Army	99,552	5,574	216	36
Reserve Army	59,904	2,448	108 to 216	24
Popular Levy	28,800	—	—	—
Total -	188,256	8,022	324 to 432	60

Since 1885 the Bulgarian Army has more than doubled; it is at the present time 7 per cent. (rationed strength) of the population.

FRANCE.

The first outcome of the discussions on the military situation after the termination of the war with Germany in 1871 was the "Loi sur le Recrutement de l'Armée," dated 27th July, 1872. The period of service with the colours was fixed by it at 5 years, but the annual contingent was divided into 2 portions, the men belonging to the second portion being called up for 1 year only. Personal service was further made obligatory upon every Frenchman.

Simultaneously the system of substitutes was done away with, and the participation of military individuals in public elections forbidden. The creation of a Territorial Army was ordered, and the institution of 1 year's voluntary service introduced.

Serious difficulties were experienced in working this law, particularly as regarded the 5 years' period of active service, which was never given full effect to; both because the conviction grew that with universal service 5 years was too long a term to exact, and also for financial reasons.

Still it was many years before the organic law of 15th July, 1889, was introduced, which was framed to meet these difficulties. By it, service with the colours was reduced from 5 years to 3, that in the reserve being increased by 3 years, and in the Territorial Army by 4 years. Exemptions were altogether abolished, and a 1 year's period of service substituted. The privilege of 1 year voluntary service was restricted to those attending certain higher educational establishments. The total period of liability to service was extended to 25 years.

The law came into force in 1890, and the effect of this last provision, which was made retrospective, was to place at the disposition of the War Minister 600,000 men under 45 years of age who had served, and had under the previous law completed their period of liability.

In 1892 an important modification was made in the law of 1889, by the period of reserve service of the Active Armies being increased to 10 years, the period in the reserve of the Territorial Army being at the same time reduced to 6 years.

According to French sources of information, the law of 1889 will, when it has been in operation 20 years, give a total of $4\frac{1}{3}$ millions of men trained to arms.

The "Loi relative à l'Organisation de l'Armée" of 24th July, 1873, provided for the organisation of the increased number of men that became available for military service under the Recruiting Law of 1872. The country was divided into 18 regions, or army corps districts; Algeria formed a 19th. Each region furnished an army corps, consisting normally of 2 infantry divisions, 1 cavalry and 1 artillery brigade, 1 engineer battalion, and 1 train squadron. The Army was to be recruited from the whole of France; but in the event of mobilisation the several bodies of troops were to be completed to war strength by those liable to be called up whose residence was in the region concerned.

The units of the Territorial Army were in war to be employed as garrisons, for the occupation of the lines of communication, for the defence of the coast and important strategical points; formed in brigades, divisions, and army corps it can also be attached to the field army.

The constantly increasing number of troops in the 6th Region, on the German frontier, which in total strength equalled the constitution of 3 army corps, led in 1897 to the creation in France of a 20th Army Corps, the headquarters of which were located at Nancy.

By the "Loi relative à la Constitution des Cadres et des Effectifs de l'Armée active et de l'Armée territoriale," of the 13th March, 1875, the number of units were defined.

In the infantry these were :—

144 Line regiments, each of 4 battalions and 2 depôt companies.
30 rifle battalions, each of 4 companies and 1 depôt company.
4 Zouave regiments of the same constitution as the Line.
3 regiments Algerian Tirailleurs, each of 4 battalions and 1 depôt company.
1 foreign legion of 4 battalions.
3 battalions of Algerian Light Infantry.
5 disciplinary companies.
Total, 641 battalions and 329 depôt companies.

In the course of time important modifications were introduced. In 1881, captains were mounted at the public expense; 1882, drummers abolished, two years before, were re-introduced; 1884, the increase of the foreign legion by 4 battalions, and its constitution in 2 regiments; also the formation of a 4th Regiment of Algerian Tirailleurs.

In 1887, the 4th Battalions and depôt companies of the Line regiments were dissolved, with a view to obtaining means to allow of the companies of the other battalions being raised to war strength. A cadre of 9 officers and 72 non-commissioned officers was retained to admit of the 4th battalions being promptly reconstituted in the case of mobilisation.

An increase was simultaneously made of 18 regional regiments, to be employed in the first instance to garrison fortresses.

In 1888, the 12 rifle battalions located in the 14th and 15th Regions were each raised from 4 to 6 companies, the peace establishment of companies was increased, and the battalions were furnished with equipment and pack transport (54 mules per battalion) suitable to mountain warfare. Since that year the whole of the rifle battalions have been augmented in the same way.

In 1889, the battalions of Algerian Light Infantry were each increased to 6 companies; in 1891, 4th Battalions were formed in the 18 regional regiments, a new infantry regiment, the 163rd, and another battalion to the foreign regiment.

By the law of the 4th March, 1897, the Minister of War was empowered, as means became available as regarded recruiting and finances, to complete gradually a 4th Battalion in each sub-divisional regiment (Nos. 1 to 144 and 163), without any reduction being effected in the strength of the existing battalions. In 1897, this was done in 20 regiments, and within 3 years the augmentation will be completed, when the infantry will have been increased by 145 battalions and about 50,000 men. The total number of units will then be 729 battalions with 3,000 companies (including depôt companies) in round numbers; an increase of 88 battalions since 1874.

The cavalry consisted under the law of 1875 of 77 regiments, being 12 of Cuirassiers, 26 of Dragoons, 20 of Chasseurs, 12 of Hussars, 4 of Chasseurs d'Afrique, and 3 of Spahis, with a peace strength of 61,400 men.

The changes in organisation since effected are limited to the combination of the corps cavalry brigades into 6 permanent inspection districts under lieut.-generals, the creation of 12 new regiments, and the formation of a new cavalry division, the 7th. By a law of 1887 the Minister of War was empowered to raise 14 regiments; but of these the 14th Cuirassiers, and 32nd Dragoons have yet to be formed. The actual increase, therefore, since 1875 has been 55 squadrons, including 2 native squadrons added to the 1 Spahi regiment, to be increased shortly to 65.

Considerable changes and augmentations have taken place in the artillery. By the 1875 law there were 31 foot batteries, 6 mountain batteries, and 266 field and 57 horse batteries in 38 regiment, 19 of which to furnish the corps, and 19 the divisional artillery for the several army corps. There were also 2 artillery train regiments, the 24 companies of which were allotted later on to the several regiments, and 2 regiments of pontoniers. The former had to furnish the horses for the ammunition

formations and bridging trains. There was no higher tactical organisation in the foot artillery, 12 batteries of which were located in Algeria.

By the law of the 24th July, 1885, a completely different organisation was given to the artillery. The elaboration of the new system of frontier defence necessitated the prompt creation of a body of artillery suited to fortress warfare. For the purposes of efficient training a separation was necessitated of the mounted from the dismounted batteries. The previously existing foot batteries and train companies were consequently abolished, and 16 fortress artillery battalions formed, each of 6 batteries, which since 1892 have been entitled Foot Artillery. In 1896 and 1897 it was increased by 7 battalions, and will shortly be augmented to 18 battalions, each of 6 batteries. Including 4 batteries in Algeria and Tunis, the foot artillery consisted at the commencement of 1898 of 107 batteries.

As regards the field artillery, the 1st Regiment of each brigade consisted of 12 field batteries, and the 2nd Regiment of 8 field and 3 horse batteries. At the end of 1888, 12 mountain batteries (*batteries alpines*) were added to the divisional regiments of the 14th and 15th Brigades, and 12 batteries for the 19th Army Corps in Algeria ; in 1889 a 9th Battery was added to each of the 2nd Regiments of brigades ; in 1894 2 new regiments (the 39th and 40th) were formed with 28 batteries together, so that between 1875 and 1898 there was an increase of 159 batteries (109 field and 50 foot). By the conversion of 5 horse batteries into field, the number of horse batteries during the same period was reduced to 52. It has been stated in the Press that 1 horse battery is shortly to be added to each artillery brigade.

Previous to the law of 1873 the engineer arm consisted of 3 regiments each with 2 miner, 14 sapper, and 1 transport company, with a total strength of 9,000 men. These were developed into 4 regiments, each of 5 battalions, 1 depôt, 1 railway, and 1 transport company. In 1889 a 5th Regiment (railway) was raised and 2 new regiments were formed by a re-arrangement of battalions, and the duties of the pontonier regiment transferred to the engineer regiments.

The peace strength was constantly augmented, as a result of the successive increase in the number of the units of the several arms. At the latter part of 1872 it was 351,000, which was increased to 415,000 by the working of the 1875 law. In 1898 the general paper total amounted to 598,000, the actual effectives to 544,000 officers and men.

The system of fortifications in France has also undergone a complete revolution during the past 25 years, based on the experiences as regards her fortified places in 1870-71 and on the necessity for covering the east frontier by new fortified works. In forming a judgment on the new system created, it seems doubtful whether the number of fortresses and independent works is not greater than there is any necessity for, and whether France would be in a position to occupy them effectively in case of war without a sensible weakening of the field army ; for the Territorial Army alone would not suffice for their defence.

The changes and progress made in the railway service, as regards the construction of new lines of strategic importance, the extent and nature of rolling material and the organisation of railway employés and railway troops have been remarkable. There are now the Railway Regiment (5th Engineers) and 9 sections of railway employés each of a strength of 1,273.

Between 1875 and 1894 the length of main lines (not including local ones) has more than doubled. Running out in every direction from Paris, the old main lines have been perfected and connected in such a way that for a concentration on the eastern frontier almost every army corps could be allotted a separate double line.

In 1874 the war strength of the Army was in round numbers 1,750,000 men; in *L'Année Militaire* for 1892, the number of trained men was stated to be 4,372,000; in *Le Spectateur Militaire* for 1896 it was estimated at 4,800,000, and in a pamphlet by Captain Molard at 4,350,000. But these figures can only be reached when the recruiting law of 1889 has been 25 years in force. For the actual field army—the active army and its reserve—the war strength in 1898 may be estimated at from 1,600,000 to 2,000,000 men.

The French Army before the commencement of the 1870 campaign had 368 battalions, 252 squadrons, and 164 field batteries. After the completion of the 4th Battalions in the whole of the infantry regiments and the creation of the 2 rifle battalions and 2 cavalry regiments already authorised, the tactical units of the Active Army will number 731 battalions, 457 squadrons, and 508 field batteries.

The Third Republic will therefore be able to dispose of an Army larger than that which existed in the time of the Empire by 363 battalions 205 squadrons, and 344 field batteries.

ITALY.—1873-98.

By the law of the 30th September, 1873, the Italian Army consisted of 7 army corps, comprising 16 infantry divisions; 10 regiments of 4 battalions of 4 companies of Bersaglieri = 160 companies; 80 regiments of 3 battalions of 4 companies of the Line = 960 companies; 7 battalions = 24 companies of Alpine troops; 9 brigades of cavalry, comprising 20 regiments = 120 squadrons; 10 regiments of field artillery = 100 batteries; 4 regiments of fortress and coast artillery = 60 companies; 2 regiments of engineers = 40 companies.

The number of army corps was increased by 3 in 1877, without any corresponding increase being made, however, to the existing units. A further increase of 2, making in all 12 army corps, was made in 1882, when the number of units in the infantry was also increased. The regiments of Bersaglieri were fixed at 12, though the number of companies was reduced from 160 to 144. The infantry of the Line was increased from 80 to 96 regiments, having in all 1,152 companies. The Alpine troops were augmented so as to form 6 regiments having 72 companies. The number of squadrons was increased to 132; and the field artillery to 120 batteries. Two divisions of 4 batteries of horse artillery were formed;

the engineers were increased to 64 companies; 12 supply companies and an equal number of sanitary companies were constituted.

Since 1882 the changes have been few; there have been none in the infantry; the Alpine troops have been augmented by 3 companies, the number of regiments being increased to 7. There has been an increase of 11 squadrons to the cavalry, of 66 batteries to the field artillery, of 2 batteries to the horse artillery, and 1 regiment of mountain artillery, comprising 15 batteries grouped in 5 divisions, has been formed.

The fortress and coast artillery has been increased to 22 battalions, comprising 78 companies, and the engineers have been formed into 5 regiments, numbering 17 battalions, which contain 66 companies.

The peace strength has varied considerably. In 1869 it numbered 183,441 men, and it rose steadily until 1889-90, when the highest strength of 15,292 officers, 265,541 men, and 38,414 troop horses was reached. It then declined, but rose again to 13,318 officers, 264,448 men, and 38,434 horses. The net increase between 1873 and 1898 of non-commissioned officers and men was:—

Alpine Troops	8,445
Cavalry	5,032
Field Artillery	7,684
Horse Artillery	1,165
Mountain Artillery	2,218
Fortress and Coast Artillery	1,714
Engineers	4,019
Total	30,277

The establishments authorised are seldom if ever reached, and an average strength is fixed for estimates, which in 1897-98 was 13,392 officers, 209,337 men, and 36,182 troop horses.

In war the increase in strength has been proportionately greater, as will be seen by the following comparison:—

By the law of the 30th September, 1873, the strengths of the several formations were:—

	Officers.	Men.	Horses.	Guns.
Standing Army	11,568	328,760	57,168	920
Ersatz Troops	—	100,000	—	—
Mobile Militia	6,060	200,000	12,832	480
Total	17,628	628,760	70,000	1,400

By the law of 1898 there were:—

Standing Army	14,397	511,788	94,201	1,242
Mobile Militia	5,599	219,250	17,835	378
Territorial Militia	8,161	379,782	736	—
Total	28,157	1,110,820	112,772	1,620

The Mobile Militia, which answers to the Landwehr, has undergone great changes. The law of the 28th June, 1897, increased the number of units in every branch, and created for the first time cavalry formations.

The previously existing supply and sanitary companies were dissolved. The number of units for which provision was made was as follows :—

Infantry - - - -	51 regiments, 153 battalions, 612 companies.
Bersaglieri - - - -	20 battalions, 80 companies.
Alpine Troops - - -	38 companies.
Cavalry - - - -	31 squadrons.
Field Artillery - - -	15 divisions, 63 batteries.
Mountain Artillery - -	15 batteries.
Fortress and Coast Artillery -	78 companies.
Engineers - - - -	54 companies.

Besides the above a special Militia for Sardinia has existed since 1873. Its existing composition was fixed in 1882, viz., 8 infantry regiments, 1 battalion Bersaglieri, 1 field artillery division of 4 batteries, 1 section mountain artillery, 1 fortress artillery company, and 1 engineer company.

The establishments of the units of the Mobile Militia are the same as in the corresponding units of the Active Army. Of the men, about a quarter (2nd Category) have had no training at all, and another quarter have had less than 6 months' training. Since 1887 they have been reckoned on for employment with the Army of the 1st Line.

Territorial Militia.—The actual organisation of this branch of the armed forces dates from 1880, in which year its constitution of 300 battalions of infantry and 100 companies of fortress artillery was authorised by Royal Decree. It has since been augmented, and by the law of the 28th June, 1897, consists of 324 battalions, comprising 1,296 companies, 22 battalions of Alpine troops numbering 75 companies, 100 fortress artillery companies, and 30 engineer companies.

Although since 1888 the Territorial Militia has been claimed as an integral part of the Army for co-operation in the defence of the country, two-thirds of the force are not trained.

JAPAN.—1874-98.

The constitution of the peace Army on 1st April, 1875, was the following :—

Units.—21 battalions, 4 squadrons, 8 batteries, and 1 engineer company.

Strength.—19,460 infantry, 510 cavalry, 1,110 artillery, 120 engineers. Total 21,200.

This organisation was further developed by successive laws, until in 1880 it had reached the following increased proportions :—

Units.—46 battalions, 3 squadrons, 20 batteries (120 guns), 10 companies of engineers, 9 companies of coast artillery.

Strength.—36,106 infantry, 507 cavalry, 3,206 field artillery, 1,570 engineers, 720 coast artillery.

Previous to the war with China, in 1894, a further law, that of the 21st January, 1889, had resulted in Japan possessing an Army copied in every detail from the Prussian system.

The mobile field army consisted of:—

6 Line divisions each of 12 battalions, 3 squadrons, and 6 batteries.
1 Guard division of 8 battalions, 3 squadrons, and 4 batteries.

The peace strength was 67,000 men with 91,000 reserves.

The war strength of the field army was 90,000 combatants, being about 14,000 per division.

But the most important development of the Japanese Army has been the addition to it of 6 new divisions on the peace establishment authorised by the Imperial Order of the 16th March, 1896. This increase will not be fully attained before 1903, but the peace strength reached at the end of 1896 was 98,221, or, including the gendarmerie, 102,094. To this number has to be added the reserve, 99,571 non-commissioned officers and men, and the Landwehr, 68,454 men.

AUSTRIA-HUNGARY.—1874-98.

In 1874 there was no division into army corps. The monarchy was divided into territorial districts, which were of different sizes. Cavalry division commands were first introduced in 1883.

The existing constitution of the Austrian Landwehr infantry in 9 brigades was inaugurated in 1894; the 4 cavalry brigades commands in the Hungarian Landwehr dates from 1879.

The constitution of the troops in the larger bodies differs, and is indicated by the *ordre de bataille*. An army corps consists of 2 infantry divisions and the cavalry, artillery, and train located in the corps district; the 2nd Corps (Vienna) has 3 infantry divisions; a cavalry division is allotted to the 1st Corps (Cracow), 2nd Corps (Vienna), and 10th Corps (Przemysl), and 2 divisions to the 11th Corps (Lemberg).

The infantry division consists of 2 infantry brigades, and to some are attached technical troops and a sanitary detachment. The cavalry divisions are composed of 2 cavalry brigades, and since 1895 rifle battalions have been attached to them. The artillery allotted to divisions does not form a part of the division in peace, but the divisional commander has the power of inspecting them.

The increase in the number of infantry regiments by 29 is not in reality so large an augmentation as would appear; for owing to the reduction effected in the number of battalions per regiment from 5 to 4, the actual increase in battalions has only been 26. The important increase of the artillery, and the raising of numerous new regiments of this arm are noticeable.

There have been extensive changes in the organisation of the technical troops, by the conversion of the engineer formations into independent pioneer battalions and the constitution of railway and telegraph regiments.

In 1874 the Army had no corps organisation; there are now 15 army corps. The infantry was formed into 30 divisions, and there are now 31; there were no cavalry divisions, whereas there are now 5. The changes effected in the several arms, which have almost exclusively taken the form of increase, are shown in the following table:—

——	Regular Army.		Austrian Landwehr.		Hungarian Landwehr.		Total Numbers.	
	1874	1898	1874	1898	1874	1898	1874	1898
Infantry (Rifles).								
Brigades	63	70	—	9	14	14	77	93
Regiments	81	110	—	26	—	28	81	164
Battalions	440	466	91	92	92	94¼	623	652¼
Cavalry.								
Brigades	20	18	—	—	—	4	20	22
Regiments	41	42	—	6	10	10	51	58
Squadrons	246	252	28	39	40	60	314	351
Field Artillery.								
Brigades	—	14	—	—	—	—	—	14
Regiments	13	56	—	—	—	—	13	56
Field Batteries	130	224	—	—	—	—	130	224
Horse Batteries	39	16	—	—	—	—	39	16
Mountain Batteries ...	5	14	—	—	—	—	5	14
Fortress Artillery.								
Regiments	—	6	—	—	—	—	—	6
Battalions	12	18	—	—	—	—	12	18
Companies	60	72	—	—	—	—	60	72
Engineers.								
Regiments	2	—	—	—	—	—	2	—
Battalions	10	—	—	—	—	—	10	—
Companies	56	—	—	—	—	—	56	—
Pioneers.								
Regiments	1	—	—	—	—	—	1	—
Battalions	5	15	—	—	—	—	5	15
Companies	25	75	—	—	—	—	25	75
Railway and Telegraph Troops.	—	1	—	—	—	—	—	1
Regiments	—	3	—	—	—	—	—	3
Battalions	—	12	—	—	—	—	—	12
Companies								

The increase that has been effected in the strength of the several categories of the forces is shown by the following table.

Branch of the Service.	1874.				1898.			
	Officers.	Other Ranks.	Horses.	Horsed Guns.	Officers.	Other Ranks.	Horses.	Horsed Guns.
Regular Army.								
Infantry and Rifles ...	7,000	161,325	561	—	9,758	186,404	1,136	—
Cavalry	1,517	42,107	37,023	—	1,680	45,780	40,740	—
Field Artillery	936	19,799	7,488	676	1,465	27,451	12,454	1048
Fortress Artillery	332	7,398	77	20	382	7,730	134	—
Pioneer Troops	340	8,013	18	—	465	8,415	15	—
Railway and Telegraph Regiment ... ... (Field Railway Detachment)	(10)	(345)	—	—	79	1,475	4	—
Train	134	1,985	1,271	—	382	3,286	1,908	—
Sanitary Troops	69	2,498	—	—	83	3,058	—	—
Total	10,338	243,470	46,438	696	14,294	283,599	56,391	1048
Austrian Landwehr.								
Infantry and Rifles ...	546	2,730	—	—	1,470	20,432	144	—
Cavalry	3	42	35	—	170	1,861	1,282	—
Total	549	2,772	35	—	1,640	22,293	1,426	—
Hungarian Landwehr.								
Infantry	552	7,636	—	—	2,015	20,854	150	—
Cavalry	140	1,850	1,470	—	340	4,170	3,510	—
Total	692	9,486	1,470	—	2,335	25,024	3,660	—
Grand Total ...	11,579	255,728	47,943	696	18,289	330,916	61,477	1048

The number and strength of the formations in war are not published.

An infantry brigade is composed of from 6 to 9 battalions of infantry or rifles (or Landwehr); a cavalry brigade of 2 cavalry regiments.

The infantry (Landwehr infantry) division s composed of all three arms, and by means of the attachment to it of the necessary auxiliary services it is suited for independent action.

The divisions are either combined in corps, or placed directly under the army command. Their composition is as a rule the following:—2 infantry brigades, divisional cavalry and artillery, pioneer companies and bridging equipment, the auxiliary services, and a train squadron.

The normal auxiliary services consist of a divisional ammunition park, and sanitary establishments, an infantry supply column with provisions for 7 days (including 3 days' reserve rations). The train squadron horses the transport of the staff and sanitary service, and controls the provision column formed from civil transport.

The cavalry divisions are composed of 2 cavalry brigades, divisional artillery, and also of infantry (rifle battalions) as required. The auxiliary services are on the same scale as allotted to infantry divisions—and there is further a cavalry telegraph formation.

The army corps consist of from 2 to 3 infantry divisions, corps artillery, a number of pioneer companies, a train squadron, and auxiliary services. There are a light bridge train, a corps telegraph and telephone

formation, a corps ammunition park, an intrenching tool column, and a corps supply column. The latter carries 7 days' supplies for the corps headquarters and the troops not belonging to the divisions.

ROUMANIA.—1866-98.

The formation of the existing Army is practically the work of King Charles, who as Prince Charles of Hohenzollern, was elected in May, 1866, to be the ruler of Moldavia and Wallachia.

By agreement with the Porte, the strength of the Army was restricted to 30,000 men of the Regular Army. Previous to the war with Turkey, in 1875-76, the peace strength had reached 977 officers, 16,220 men, 2,739 horses, and 96 guns, The war strength in 1875 was estimated officially to be 1,613 officers, 62,158 men, and 14,921 horses.

The army of operations at the close of the mobilisation in 1877 amounted to over 50,000 men, with 180 guns, and the entire number that could be made available, by resort to the current year's class, the Militia, and the National Guard, was about 70,000.

The organisation of the Army at that time was in 2 army corps, each of 2 divisions of 2 infantry brigades, 1 cavalry brigade, and 12 batteries. The total number of units was 51 battalions, 48 squadrons, 144 guns, and 4 pioneer companies.

The existing organisation gives largely increased results as regards the numbers of units on the peace strength, and the strength that can be made available on mobilisation. As regards units, there were in 1897 4 army corps, and an independent division in the Dobrudscha. Each army corps was composed of 2 infantry divisions, numbering together 4 infantry brigades, 8 regiments, 24 battalions, 1 rifle battalion, 1 cavalry brigade (the 3rd and 4th Army Corps located at Galatz and Jassy respectively have 2), and 3 regiments of field artillery. Each corps has the cadres of 8 battalions of Militia attached to it. The 2nd and 3rd Corps have also each 1 regiment of 10 companies fortress artillery, and 1 regiment of 14 companies engineers.

The independent Dobrudscha division has 2 regiments of infantry, 6 battalions, 2 rifle battalions, and 1 cavalry regiment.

The formation of a 5th Army Corps has been planned for years, for the special purpose of garrisoning the fortresses.

With this in view, small new formations have been made annually, and in the spring of 1898 the creation of 3 new infantry regiments was decided on (Nos. 35, 36, 37). Besides these (9 battalions), there are available 8 battalions of the Dobrudscha division—together 17 battalions. Only 8 more battalions, therefore, are wanting to complete the full infantry establishment for the new corps. In 1898, also, the previous arrangement by which each infantry regiment had 1 permanent and 2 semi-permanent battalions, was abolished. In future there will be 3 permanent, or territorial battalions, and 1 depôt battalion. This simplifies the organisation, but will make the strength of companies extraordinarily weak.

The gradual conversion of the Calarasi cavalry from a Militia formation into Regular cavalry has also progressed during 1898. The total

number of units in 1897 was 4 army corps and 1 division, comprising 108 battalions, 34 Militia cadre battalions; 2 brigades of Regular cavalry (Rosiori) numbering 24 squadrons, and 4 brigades of Militia cavalry (Calarasi) 46 squadrons, together 70 squadrons; 12 regiments of field artillery, comprising 32 batteries light 7·7-centimetre guns, 32 batteries heavy 8·7-centimetre guns, 1 mountain battery and 8 horse batteries, together 73 batteries; 2 regiments fortress artillery, together 4 battalions: 20 companies; 2 regiments of engineers, together 6 battalions: 28 companies; 4 train squadrons, and 4 sanitary companies.

As regards the peace strength, there were in 1897, 3,269 officers, 388 officials, 54,445 men, 390 guns, and 11,723 horses, besides 70,270 men and 7,200 horses called out for a period of training, but not on permanent service. Having regard only to the men serving permanently, these numbers are more than three times as great as they were before the war with Turkey in 1875-76.

The increase of the mobilised field army of 4 army corps is no less striking. The rationed strength amounts to 3,948 officers, 167,316 men, 52,604 horses; giving a total of 171,264 officers and men, nearly 2·7 per cent. of the population. The combatant strength is 140,352 (100 battalions, 48 squadrons, 64 batteries, 16 technical companies), with 384 guns.

RUSSIA.—1873-98.

For purposes of clearness and comparison the period has been subdivided into two parts. The first part is that covered by the reign of the Emperor Alexander II., viz., from 1874 to the war of 1877-78. The second embraces the reign of Alexander III., during which time the Minister of War was Vannovski.

In 1873 the organisation of the Russian Army was the outcome of re-organisation in 1862. There were then, as now, Regular troops and Irregular (Cossacks and Militia), besides the Opoltschenie or Reichswehr. The Regular troops were partly field troops and partly local troops.

The infantry of the field troops consisted of 12 Guard, 16 Grenadier, and 160 Line regiments, together 580 battalions. These formed 3 Guard, 4 Grenadier, and 40 Line divisions. The 3 Guard divisions were alone formed in a corps, all the other divisions were under the commanders of the military districts created in 1862. Each regiment, excepting in 4 divisions located in the Caucasus (Grenadier, 19th, 20th, 21st, which had 4 battalions), had 3 battalions with 5 companies, 1 of which was a light or rifle company. There was also, as there still is, a non-combatant company in each regiment.

There were further 1 Finnish, 4 Guard, 4 Grenadier, and 24 Line rifle battalions, each of 4 companies; 4 battalions formed a brigade.

The cavalry numbered 4 Guard Cuirassier, 2 Guard Dragoon, 2 Guard Lancer, 2 Guard Hussar, 18 Line Dragoon, 14 Lancer, and 14 Hussar regimnets, together 56 regiments. The 4 Guard Cuirassier regiments, with the combined Guard Cossack regiment and the Oural Guard squadron were formed into the 1st Guard Cavalry division. The rest of the Guard regiments formed the 2nd Guard Cavalry

division. 7 Line cavalry divisions were composed each of 2 Dragoon, 2 Lancer, and 2 Hussar regiments, together 6 regiments; the 4 Caucasus Dragoon regiments formed the Caucasus cavalry division. There were, therefore, in all 10 cavalry divisions. Each regiment was composed of 4 active squadrons and 1 reserve squadron.

The artillery was in proportion to the number of infantry and cavalry divisions. The field artillery consisted of 47 brigades in Europe and the Caucasus, 2 in Turkestan, 1 in East Siberia, together 50 brigades and a West Siberian battery. The whole of the batteries excepting this latter, had 8 guns. The horse artillery consisted of 4 Guard batteries, and 7 brigades, each of 2 batteries of 8 guns.

The engineer formations were 5 sapper brigades.

The local troops were of several different kinds. The fortress troops, which consisted of 8 infantry regiments, each of from 2 to 3 battalions, and 5 independent battalions, besides 2 fortress detachments. The fortress artillery had since 1870 been composed of 59 companies. In war there were to be 91 companies.

There were also frontier battalions, to serve as garrisons to the military districts in the Caucasus, East and West Siberia, and Turkestan; but which were intended also for field service. Of these there were 48 of 5 companies, of which 1 rifle company. Then the reserve troops, which at that time were actually depôt troops. They served for training recruits and remounts, and could be utilised as a reinforcement in war. Of these there were for the infantry 80 reserve battalions, for the cavalry 56 reserve squadrons, and for the artillery 4 reserve field artillery brigades and 2 reserve horse artillery brigades. The engineers had 4 reserve sapper battalions, of which 1 battalion in the Caucasus.

Another category consisted of battalions and detachments for internal duty in garrisons. There was further a small establishment of instructional troops.

Altogether the establishments of the Regular Army amounted to 733,761 men, of whom 517,000 were field troops.

In 1874, consequent upon the introduction of universal service, this organisation was completely changed, with a view in the first place to the formation of reserve troops in the proper sense, to the re-organisation of the fortress troops and the creation of Ersatz troops in the event of mobilisation, and in the second place to the increase in the number of field troops on the peace establishments. The re-organisation further embraced the combination of the divisions in army corps, of which 14, excluding that of the Guard already in existence, were to be placed on the western frontier.

The following were amongst the principal changes inaugurated :—

Infantry.—All regiments were to be eventually increased from 3 to 4 effective battalions of 4 companies. A new division, the 41st, was to be formed in the Caucasus.

Cavalry.—The previously existing 7 independent Line divisions were expanded into 14, being the combination with the Line regiments of the 1st Category of the Don Cossack regiments, which had been inde-

pendent. The divisions were formed in 2 brigades, each of which comprised 1 Dragoon, 1 Lancer, 1 Hussar, and 1 Cossack regiment. An independent Don Cossack division of 4 regiments was formed. The reserve squadrons were converted into Regular Ersatz squadrons.

Artillery.—3 new batteries were raised for the newly-formed 41st Infantry Division. A 5th battery was added to the Guard Horse Artillery, which still forms, together with the Guard Don battery, the Guard Horse Artillery brigade. The 14 field and 4 reserve batteries were formed into 21 field and 2 Ersatz batteries of 6 guns. The constitution of the field artillery park was subject to many changes. By an order of 1875 each infantry division, with its artillery, was to be provided with a flying divisional park.

The engineer troops were to consist of 5 brigades: Nos. 1 to 4 and 1 Caucasus; Nos. 1 to 4 consisting of 3 sapper and 2 pontoon battalions, field telegraphs, and engineer park. Each brigade to have a railway battalion, the first of which was formed in 1876; the Caucasus brigade to be composed of 3 sapper battalions, 1 pontoon company, 1 field engineer, and 1 field telegraph park.

The war of 1877-78 broke out at a period when the changes in organisation that had been planned were still in their initial stages. Improvisations of every sort had, therefore, to be resorted to. In November, 1876, the formation of a field army was commenced with the mobilisation of the 7th, 8th, 9th, 10th, 11th, and 12th Army Corps, located in the southern portions of the Empire. In February, 1877, the mobilisation took place of the 1st, 2nd, 3rd, 4th, 5th, 6th, 13th, and 14th Army Corps.

At the commencement of 1877 the strength of the whole Army, including the troops for internal service was by the establishments 22,952 officers and 906,079 men. The actual strength was 21,189 officers and 884,200 men.

The mobilised troops consisted altogether of 286 battalions, 363 squadrons and sotnias, 1,154 guns, with a strength of 460,000 men. There were still available to be called up about 320,000. Simultaneously with the mobilisation of the field troops in 1876 and 1877, the Ersatz formations designed for these were created. But the formation of the projected reserve troops was not possible from want of reserve men. The fortress and local battalions that already existed in peace were therefore converted into reserve troops. Three railway battalions were formed during the course of the war.

At the commencement of 1878, the numbers present had reached the large numbers of 33,048 officers and 1,511,384 men, distributed as follows:—

	Officers.	Men.
Field infantry - -	14,783	677,917
Cavalry - - - -	2,393	54,133
Artillery - - -	2,220	89,740
Engineers - - -	612	26,020
Fortress, local, and reserve troops	3,880	311,767
Ersatz troops - -	2,164	226,345

At this time there remained still unmobilised 12 infantry and 6 cavalry divisions, with artillery, 3 rifle and 1 sapper brigade, fortress troops, etc.

The Army attained to its greatest strength in July, , when 1898 the field troops consisted of 192 infantry regiments, 32 rifle and 36 frontier battalions, 224 squadrons, 292 field, 26 horse, and 10½ mountain batteries, 15½ sapper, 6 pontoon, and 3 railway battalions. The reserve, fortress, and local troops numbered 331 battalions, 68 batteries, 41 fortress artillery battalions, and 675 local battalions. The Ersatz troops were 152 battalions, 56 squadrons, 28 batteries. The total strength of the Army was at this time 40,000 officers, 1,626,000 men, 245,000 horses. There were still the 12 infantry and 6 cavalry divisions at home not mobilised. There were further serving 16 battalions, 668 sotnias and 36 batteries of Cossack troops, numbering 3,042 officers and 118,290 Cossacks.

After the close of the war, a new era of reforms was commenced. The army corps formation adopted during the war was preserved, but without the number of divisions in each corps being equalised, or all the infantry and cavalry divisions being included in the corps. The number of existing corps was 17, including the Guard, Grenadier, and Caucasus corps. A 15th was added to the 14 ordinary corps in 1879, making 18 in all. In the same year, conformably to the 1873 scheme of re-organisation, the regiments of 38 infantry divisions were increased from 3 to 4 battalions each, the rifle companies being done away with. In 1878 the 1 cavalry division in the Caucasus was expanded into 3 divisions by the combination of Cossack formations with Regular regiments. In 1880, 8 Finnish rifle battalions were created. In the artillery, re-armament was effected with the new breech-loading guns, the first 2 batteries of each brigade being armed with heavy, the other 4 with light guns. The whole of the horse artillery was provided with a lighter gun. 2 batteries of each of the 5 Caucasus brigades were furnished with mountain guns.

An important change was made in the local troops, to which at this time the fortress and reserve troops belonged. A large number of the local battalions and detachments, the fortress infantry and the whole of the reserve battalions formed during the war were disbanded on demobilisation for the sake both of economy, and to clear the way for a comprehensive new organisation. By this means a temporary reduction of about 2,000 officers and 100,000 men was effected.

But as early as the close of 1878 orders were given for the formation from amongst these disbanded troops of 96 reserve cadre battalions, each of 5 companies, which were in war to be expanded into 5 battalions, of which 4 to form a regiment and the 5th to be an independent battalion. They were also to furnish a nucleus for the Ersatz battalions of the field regiments.

At the end of 1880 the peace strength of the Regular Army was 32,000 officers and 894,000 men. There were further 880 sotnias, 13 battalions, and 42 batteries of Cossacks and other irregular troops.

The foregoing was the situation at the time of the death of the Emperor Alexander II.

On the accession of his successor, Alexander III., in March, 1881, the unfavourable financial condition of the country consequent upon the war of 1877-78, imposed the difficult task of effecting economies in the Army while maintaining its strength and efficiency. It resulted in constant but slowly progressing changes in organisation, which can best be dealt with separately by arms.

1st Field Troops.—Infantry.—After the war the chief endeavour was to further develop the reserve cadre and fortress infantry, to strengthen the existing organisation of the other troops, to the improvement of the armament, the supply of *matériel*, and the system of fortification.

The existing units of Regular infantry (12 Guard, 16 Grenadier, and 164 Line regiments), therefore, received no increment beyond the creation, in 1891, of a new 165th Regiment from reserve formations. On the other hand, important developments were made in organisation; new army corps were formed from the 3rd Divisions of the corps having 3 divisions, and from the divisions that had continued independent.

In 1888 the 16th and 17th, in 1892 the 18th, and in 1894 the 19th Army Corps were thus formed, and they were all of them located in the western military districts. In 1898, 4 of the reserve brigades that had in the meantime been formed were converted into field divisions and combined with the divisions of 4 old corps to form the 20th and 21st Army Corps. There are now, therefore, besides the Guard, Grenadier, and Caucasus corps (the latter with 3 divisions), 21 army corps, each of 2 divisions, and 1 independent division (No. 21 in the Caucasus), with altogether 57 divisions (5 Guard, 4 Grenadier, and 48 Army). By the addition of the 16 regiments of the 4 new field divisions to those previously existing, the number of field infantry regiments has been increased from 165 to 181, making, with 12 Guard and 16 Grenadier regiments, a total of 209, with 836 battalions. An important change was made in 1888 in the organisation of the rifle formations in Europe. The 5 brigades existing outside the corps formation consisted each of 4 battalions. These were then formed into regiments of 2 battalions each, so that these 5 brigades, which are designed for employment with the cavalry, will each contain 4 regiments. The Guard, Caucasus, and the native rifle brigade formed in the Caucasus in 1888 only number 4 battalions. In Finland, where, since 1880-88, 9 Finnish rifle battalions, including Guard, have been recruited from natives, 2 Finland rifle brigades with Russian Ersatz was raised, consisting of 4 regiments of 2 battalions; in war the regiments will consist of 4 battalions, when 2 whole divisions will be available.

In Asiatic territory, after the expedition against the Achal-Teke Turcomans, in 1882-85, 8 Trans-Caspian rifle battalions were raised for the new territory, and formed in 2 brigades. In 1883 a second East Siberian rifle brigade was formed, making, with the previously existing 1st Brigade, 8 battalions, which were subsequently increased to 10. Since

1898 these 10 battalions have been expanded into 10 regiments of 2 battalions. Two new rifle regiments were also raised, and these 12 regiments now form three East Siberian brigades, each of 4 regiments. From the frontier battalions used for the formation of the rifle battalions, the 17 in Turkestan were in 1882 brought up to their present number of 20 battalions. In like manner the 4 East Siberian battalions were increased by 4, and the 4 West Siberian battalions by 1. Of the 20 Turkestan battalions, 5 were in 1896 converted into cadre battalions, and of the remaining 15, 14 were formed into 3 brigades; the 15th remained independent. The 5 Turkestan cadre battalions are to be expanded in war to 25 battalions.

The total number then of rifle battalions actually existing is: in Europe and the Caucasus, 68 (in war, 76); Asia, 36; and 36 (in war, 61) Frontier battalions.

Cavalry.—Partly from motives of economy, and partly having in view the creation of a uniform nature of cavalry for fighting dismounted, the whole of the 14 Hussar and 14 Lancer regiments of the Army (exclusive of the Guard) were in 1882 converted into and armed as Dragoons. Including the previously existing 14 European and 4 Caucasus regiments, there were, therefore, at that time 46 Dragoon regiments of the Line. In 1883 these were increased from 4 to 6 squadrons. Only the 4 Guard Cuirassier regiments and the 2 Guard Cossack regiments (these in peace only) had 4 squadrons. The numbers of the cavalry being still considered insufficient, recourse was had to further Cossack regiments.

In Finland the only cavalry raised from 1889 was 1 Dragoon regiment, now of 6 squadrons. A new Line cavalry division, No. 15, was formed in 1891 from 2 new Dragoon regiments, Nos. 47 and 48, and the 3rd Oural Cossack regiment, to which in 1892 were added the 46th Dragoon Regiment from the Caucasus cavalry division. This division was completed by a Kuban Cossack regiment; and in 1893 a Daghestan regiment of Militia and an Ossetine division of 2 sotnias was added to it.

The Line cavalry divisions, to which are to be added a Don Cossack division and a combined Cossack division, after their increase to 15, did not answer to the number of the then existing field army corps, viz., 17, not including the Guard and Grenadier corps. The disparity was still greater after the constitution (1892 and 1894) of 2 new army corps. In 1895-96 two independent cavalry brigades were formed from 4 newly-created Dragoon regiments, Nos. 49, 50, 51, and 58, and were attached to the 4th and 17th Army Corps. In 1896 also an independent cavalry corps was formed from the 2 divisions in the Warsaw district, Nos. 13 and 14. In 1897 a 3rd independent cavalry brigade was formed from 2 new regiments, Nos. 53 and 54, which, with the 3rd Guard cavalry brigade in the Warsaw district, was formed into a combined division. This, with the 15th Division, has been formed into a 2nd independent cavalry corps, with its headquarters equally with the 1st Corps in Warsaw.

Artillery.—The creation of a field mortar artillery commenced with the year 1889, and, by the end of 1895, 7 regiments were formed. Of these the first five have 4 batteries, the rest provisionally 2 only. In 1892, 2 mortar batteries were also added to the East Siberian Artillery brigade

In 1892, 2 light batteries were attached to each of the European rifle brigades and 2 mountain batteries for the Caucasus ; and the Finland brigade was given an artillery regiment of 4 batteries. In 1895 the artillery was for the first time grouped by divisions, each brigade consisting of 2 divisions of 3 batteries, the rifle and horse batteries only had divisions of 2 batteries. Commencing in September, 1895, most of the brigades have since been gradually augmented by a third division of 3 batteries. 4 artillery brigades of 6 batteries were also formed for the 4 newly-constituted infantry divisions. The 4 Caucasus artillery brigades were equally formed in 2 divisions and received a mountain battery in addition.

The mountain batteries that were with some of the European brigades were withdrawn, and with the exception of the 13th Brigade, which has retained its 2 mountain batteries, they have been replaced by light field batteries.

A division of 2 light batteries was formed for the Guard Rifle Brigade, which was previously without artillery. The Caucasus Rifle brigade in place of the 2 mountain batteries previously in possession received 2 light field batteries, and 1 mountain battery.

The net resultant strength is :—

Field Artillery—52 brigades	364	batteries
Artillery with Rifle formations	24	,,
Mortars	24	,,
Mountain Artillery	3	,,
Horse Artillery including Cossack batteries (15)	44	,,

In Asiatic Russia the increase to the artillery has been proportionately no less than in Europe.

It now consists of 30 batteries, distributed as follows :—

The Turkestan Artillery Brigade	7	batteries.
,, 1st East Siberian Artillery Brigade	4 light, 2 mountain, and 2 mortar batteries.	
,, 2nd East Siberian Artillery Brigade	4	light batteries
,, East Siberian Rifle Division	3	,, ,,
,, Trans-Baikal Rifle Division	2	,, ,,
,, West Siberian Rifle Division	2	,, ,,
3 Independent Trans-Caspian batteries	3	,, ,,
1 Turkestan horse mountain battery	1	battery
2 (in war 3) Trans-Baikal Cossack batteries	2	batteries.

Reserve Troops.—The development of the reserve formations has been very striking, and the new organisation inaugurated by the abolition of the local troops has produced results that mark a great advance towards readiness for war. The following table will show best the results

already obtained in peace, and those anticipated on mobilisation for war:—

Peace Constitution of Reserve Units.	Formations to be Produced from them in War.
Europe—	
4 Reserve Brigades (Nos. 46, 47, 48, 49) of 4 regiments of 2 battalions of 4 companies.	4 Infantry Divisions of 4 regiments of 4 battalions.
12 Reserve Brigades (Nos. 50 to 61), of 4 battalions of 5 companies, and including brigade No. 49.	12 Infantry Divisions of 4 regiments of 4 battalions. 13 Reserve Infantry Divisions of 4 regiments of 4 battalions.
2 independent battalions at Archangel and Zarewski, each of 5 companies.	3 regiments of varied strength.
Caucasus—	
2 Reserve Infantry Brigades of 4 regiments of 2 battalions of 4 companies.	2 Infantry Divisions of 4 regiments of 4 battalions.
2 Reserve Infantry Brigades of 4 battalions of 5 companies.	2 Infantry Divisions of 4 regiments of 4 battalions. 2 Reserve Infantry Divisions of 4 regiments of 4 battalions.
2 independent battalions, each of 5 companies.	2 regiments of 5 battalions.
Asia—	
10 Reserve cadre battalions, each of 5 companies.	10 regiments of varied strength (9 of 5 battalions, 1 of 2).
5 Turkestan cadre battalions, each of 5 companies.	25 battalions.
Total, 123 battalions.	Total, 653 battalions.

The Reserve and Ersatz Artillery.—These formations have for their object to provide the divisions formed in war from the reserve cadre troops with artillery, and they also serve for Ersatz purposes.

Up to the year 1885 there were 6 reserve artillery brigades of 6 batteries, each of which in war would form 4 batteries. Thus on the mobilisation of the 24 reserve infantry divisions, 24 reserve artillery brigades of 4 batteries would be available for them. The remaining 12 batteries would form 48 Ersatz batteries. This organisation has since been materially altered, the reserve and Ersatz batteries being separated in peace, and the number of reserve batteries increased. There are now 41 in peace, which form 164 batteries in war, including 4 mountain batteries for the Caucasus.

There are 14 Ersatz batteries in peace and 55 in war; besides the horse battery both in peace and war.

Fortress Troops.—The infantry consists of 1 regiment in Vladivostok of 5 battalions, 1 in Ossovjetz of 4 battalions, 16 regiments each of 2 battalions, and 13 independent battalions, together 54 battalions. In war, 31 regiments of 5 battalions=155 battalions.

Fortress Artillery.—In 1881 for the 15 fortresses in European Russia, and for Alexandropol, there were only 41 battalions, of which 6 had only 3 companies. There were also 11 independent companies of various strength. There are now 55 battalions, of which the battalion at Otchakoff has 5 companies, those at Batoum and Kvantun 3, and the rest 4. The number of independent companies continues to be 11, and there are 2 independent detachments. There are 12 companies of siege artillery, 2 European siege parks, and 1 Caucasus siege park; also 5 sortie batteries (2 guns) in fortresses with field artillery equipment, which form in war 16 batteries.

Ersatz Troops.—The peace formations are designed to produce in war 209 battalions for the infantry, including Guards and Grenadiers, 7 for the Rifle Brigades, 1 in Riga, 6 for Siberia, 9 companies for the Finland Rifles, 6 companies for the Plastun battalion in the Caucasus. The cavalry have in peace 1 Guard and 8 Line Ersatz brigades, with 21 cadres and 64 cadre detachments, 1 for each regiment.

The local troops had been reduced in 1896 to 147 local detachments for internal duties.

The Frontier Guards.—This service was re-organised in 1893, and now consists of an independent corps, at the head of which is the Finance Minister. It numbers now 31 brigades, with 972 officers, 31,425 men, and about 11,000 horses; and these numbers will increase to at least 36,000 men and 13,000 horses. Their value for war consists in the circumstance, that in the event of war each of the 18 brigades located on the western frontier will be in a position to furnish promptly a mounted regiment of 4 sotnias and also foot troops intimately acquainted with the ground.

Cossack Formations.—Including the regiments and batteries of the 1st Category, now forming part of the establishments of the Regular Army, there are in peace 8 foot battalions, 52¼ mounted regiments, with 311 sotnias and 20 horse batteries, having a strength in round numbers of 60,000 horsemen, etc.

In war 19 battalions, 148½ regiments, with 910 sotnias and 40 horse batteries. Total strength, from 180,000 to 250,000 horsemen and others.

The Opoltschenie or Reichswehr.—Only the 1st Category are employed for completing the Regular Army; the far more numerous 2nd Category (22 years' classes about 200,000) are utilised only for the formation of bodies of Opoltschenie troops. Lists are drawn up for the 4 youngest classes only of the men belonging to the 1st Category; and these have not served in the Army.

According to the original plan only battalions and mounted sotnias were to be formed from the Opoltschenie: but now the formation is contemplated of artillery and engineers for field and fortress service, and even of railway troops. Since 1890 small *nuclei* have been established in

military districts, and arms and equipment are supposed to be stored in readiness. The mobilisation should be completed on the 20th day. No trustworthy *data* are available respecting the numbers of the Opoltschenie formations. It has been estimated that there would be about 700 battalions of 1,000 men, 100 sotnias of 160 horsemen, 80 batteries of 8 guns, 10 foot artillery battalions, 20 engineer companies, etc. It is even contemplated to form the battalions and sotnias in regiments, and eventually constitute divisions for employment with the Army. But this is an idea far removed from realisation; and the chief use of the Opoltschenie will be in supplying the field and reserve formations, and the train with men.

In the following table the present available strengths in war are estimated in round numbers :—

	Officers.	Other ranks.
1st Field Troops :—		
Infantry	19,300	984,000
Cavalry (including Cossacks)	3,900	120,000
Artillery (of the 1st Category)	3,000	100,000
Engineers	800	40,000
Train	400	25,000
Total Field troops	27,400	1,269,000
2nd Reserve Troops :—		
Infantry	11,000	666,000
Cavalry (Cossacks of the 2nd)	2,500	100,000
Artillery (and 3rd Categories)	1,000	40,000
Engineers	200	9,000
Total Reserve troops	14,700	809,000
3rd Fortress Troops :—		
Infantry	2,500	170,000
Artillery	1,200	82,000
Engineers	300	10,000
Total Fortress troops	4,000	262,000
4th Ersatz Troops :—		
Infantry	4,400	270,000
Cavalry	800	40,000
Artillery	600	30,000
Engineers	100	6,000
Total Ersatz troops	5,900	346,000
5th Opoltschenie :—		
Infantry	9,500	686,000
Cavalry	350	22,000
Artillery	450	28,000
Engineers	100	4,000
Total Opoltschenie	10,400	740,000
6th Frontier Guards :—	1,000	34,000
Total strength	63,400	3,460,000

The local troops, transport and prisoner, detachments gendarmerie, militias, staffs, etc., are not included in these numbers, nor the general Cossack levy. With non-combatants, the total establishment strength of the Russian Army will not be estimated too high at 4 millions.

SERVIA.—1874-98.

In 1875 the peace strength of the Servian Army was 4,868; in 1885, ten years later, it had been nearly trebled, and numbered then 12,979. Between 1885 and 1897 it increased by nearly 60 per cent., for the budget for 1897 fixed it at 1,226 combatant officers, 18,900 men, 480 horses, 162 horsed field batteries, and 24 mountain guns. The peace strength of the present organisation (1898), including gendarmerie and officers, is 2,100 officers and officials, 29,900 men, and 5,900 horses. But these establishments are not reached; both in 1897 and 1898 the strength varied between 15,000 to 16,000 men during the winter, and 21,000 to 22,000 men in the summer.

The organisation is in 5 divisions, comprising 5 infantry brigades with 40 battalions, 1 brigade of cavalry with 14 squadrons, 5 brigades of field artillery with 39 field and 6 mountain batteries, 1 horse artillery battery, 9 companies fortress artillery, and 10 engineer companies.

The estimated war strength in 1875 was 148 battalions, 34 squadrons, 45 batteries, and 270 guns—ration strength 153,000 men. In 1898 the number of the units had largely increased, whereas that of the men had more than doubled. There were then 220 battalions, 39 squadrons, and 76 batteries with 416 guns, and about 360,000 men, rationed strength.

These numbers are obtained from three sources: the Regular Army, the 1st ban of the Landwehr, and the 2nd ban. The Regular Army furnishes 80 battalions, 24 squadrons (including 2 body-guard squadrons), and 46 batteries, with 80,450 rifles, 4,570 sabres, and 276 guns. To these have to be added the Ersatz formations, 20 battalions, 5 squadrons, 5 batteries, with 23,435 rifles, 1,532 sabres, and 40 guns.

The 1st ban of the Landwehr supplies 80 battalions, 10 squadrons, and 20 batteries, with 76,710 rifles, 1,800 sabres, and 120 guns. The 2nd ban 60 battalions; 5 squadrons and 20 batteries, with 53,500 rifles and 850 sabres.

But in estimating the total numbers that should under this organisation be available on mobilisation to take the field, there are important reservations to be kept in view; chief amongst which are the insufficiency of officers, the inadequacy of the cadres for the 1st ban of the Landwehr, their complete absence from the 2nd ban, and the difficulties in regard to horses and train.

FRENCH PORTS IN NORTHERN AFRICA.

By Colonel G. A. FURSE, C.B., Ret. pay.

IN the wars between Great Britain and France, at the end of the last and at the commencement of the present century, the French had no special interests to safeguard on the northern shores of the African continent. The civilised nations were at that period too much occupied by what was occurring in Europe to pay much attention to the depredations of the deys of Algiers, to the frequent ill-treatment of their consuls, and to the capturing of their merchantmen, which led to the cruel bondage of their luckless crews.

The rapacious rulers of Algiers, though frequently punished for bad faith, nevertheless persevered in their extortions, and their arrogance seemed ever to be on the increase, so confident were they in their strength. Their corsairs continued to infest the seas, and day by day the most solemn obligations were set at naught. They had, however, filled up the measure of their crimes, and the day of reckoning at last came. On the 14th of June, 1830, the French landed an army at Sidi Ferruch to punish Hussein-Khoja, the dey, who stubbornly refused to make reparation for an insult inflicted on their consul. All opposition was overcome, and on the 6th of the following month the Tricolour floated over the city and forts of Algiers.

Possibly guided by the experience that Frenchmen do not relish to live for a long time out of their country, the Government of Louis Philippe hesitated whether it should retain possession of Algeria or not, but the question of annexation was decisively settled in 1833. The French were not left in quiet possession of the newly acquired territory; much resistance and fighting followed. Abd-el-Kader raised the standard of a holy war, and many other chiefs of note placed themselves at the head of their tribes. For a period of years Algeria was a regular war school for the French Army. To put down risings and to crush all opposition, the original conquest—as it is generally the case—had to be considerably extended.

From the moment it was decided to hold the country, it became of importance to have on the African shores of the Mediterranean, not only good harbours in which French merchantmen might find a safe anchorage, with all the commodities required for loading and unloading their cargo, for taking in coals, water, provisions, etc., but also some port and naval arsenal for the French squadrons. It may appear somewhat strange that for over sixty years comparatively little should have been done in this direction, but at the bottom of this no doubt was the configuration of the coast, which is devoid of those estuaries and deep bays which lend

themselves so much to the formation of a thoroughly good military port. The best was done that was possible to improve the anchorage at Oran, Algiers, Bougie, Philippeville, and Bone by the construction of extensive breakwaters made of concrete blocks. In this manner protection has been obtained against the prevailing winds, and excellent harbours of refuge have been formed.

In the month of May, 1881, the French established the protectorate of Tunis. Various reasons have been assigned for their doing so, the most plausible being some irruptions of the Kroumirs, or Khomair, though, up to that moment, no one seems to have troubled himself to take any serious notice of the many petty raids of that tribe. These people lived between Algeria and the territory of Tunis, on the Tunisian side of the border, and plundered indiscriminately the subjects of the Bey and the Arabs of Algeria. The question had been discussed at the Berlin Congress, when it was understood that the French would be allowed a free hand in Tunis as a set-off against the British occupation of Cyprus. For two or three years nothing was done, but as the Italians were getting very influential in Tunis it was considered that the time had come for the French to assert their superiority. The thing was accomplished so easily that the French troops were recalled, but the people refused to obey any longer a ruler who had handed them over to the foreigner; an insurrection broke out, which compelled the French to send a second expedition to subdue and hold the country. By this move the French extended their seaboard from La Calle to the frontier of Tripoli. In one sense their new acquisition was not more profitable than the former, for it gave them no port adequate to the wants of a fleet. There does not exist on the whole extent of coast from the frontiers of Morocco to those of Tripoli, in the north of Africa, for about twelve hundred miles, a good naval harbour which can serve as a good base of operations, or where a squadron could put in in safety and repair damages. The port of Algiers, the largest of all, has only two open refitting docks, but has not all the machinery indispensable to execute large repairs.

With the territory of Tunis, France, nevertheless, acquired the possibility of establishing on the North African coast a first-class naval port, for not far from the City of Tunis lies the inland Lake of Bizerta with an outlet into the Mediterranean. All the harbours in Algeria are artificial, and made to serve their purpose by breakwaters run out from the land; at Bizerta, however, nature alone was the engineer. This magnificent piece of water forms a perfect land-locked harbour; it measures from east to west over eight miles, with a width of nearly six miles; it has a depth of from five to seven fathoms, and contains fifty square miles of anchorage. The lake communicates with the sea through a narrow outlet not far from the walls of Bizerta, with a width of one hundred and ten yards at the water-line and seventy yards at the bottom. The sides of this canal are lined with masonry, and form convenient quays. Beyond this canal lies the outer harbour, a triangular sheet of water bounded by the land and by two convergent breakwaters one thousand and ninety-four yards in length. The area thus enclosed measures

two hundred and twenty acres. These breakwaters were constructed to keep the canal from being choked by sand; but the desired object will not be attained without periodical dredging. The entrance to the outer harbour and to the canal are well lighted, and the passage for the ships has been carefully buoyed. It is intended that the Bay of Sebra will form the mercantile port, the Lake of Bizerta the naval.

It was on the 11th of May, 1890, that a concession was obtained from the Bey for the construction of the new harbour and canal. The work was taken in hand and completed in 1895, but up to the present moment nothing has been done to turn the Lake of Bizerta into a naval port and arsenal. On land, however, the engineers are busy throwing up a chain of redoubts for the defence of the port and approaches. It should cause little surprise that no serious beginning of the naval establishment has been made, for the cost must be exceedingly heavy. It cannot be otherwise when we reflect that all the timber, all the iron, all the cordage, all the machinery, all the fuel, in short all the materials and all the skilled labour will have to come over the sea from France.

Had it not been for the senseless jealousies between the different places, matters would have been further advanced. Tunis, however, afraid lest the development of Bizerta might be detrimental to its trade, pronounced itself in favour of a canal from the Goletta through the El-Bahira, and now sees merchant-ships of a large size making fast at the foot of the city. With Bizerta as the sea-port of Tunis, all the goods after being landed would have had to be transported sixty miles by rail.

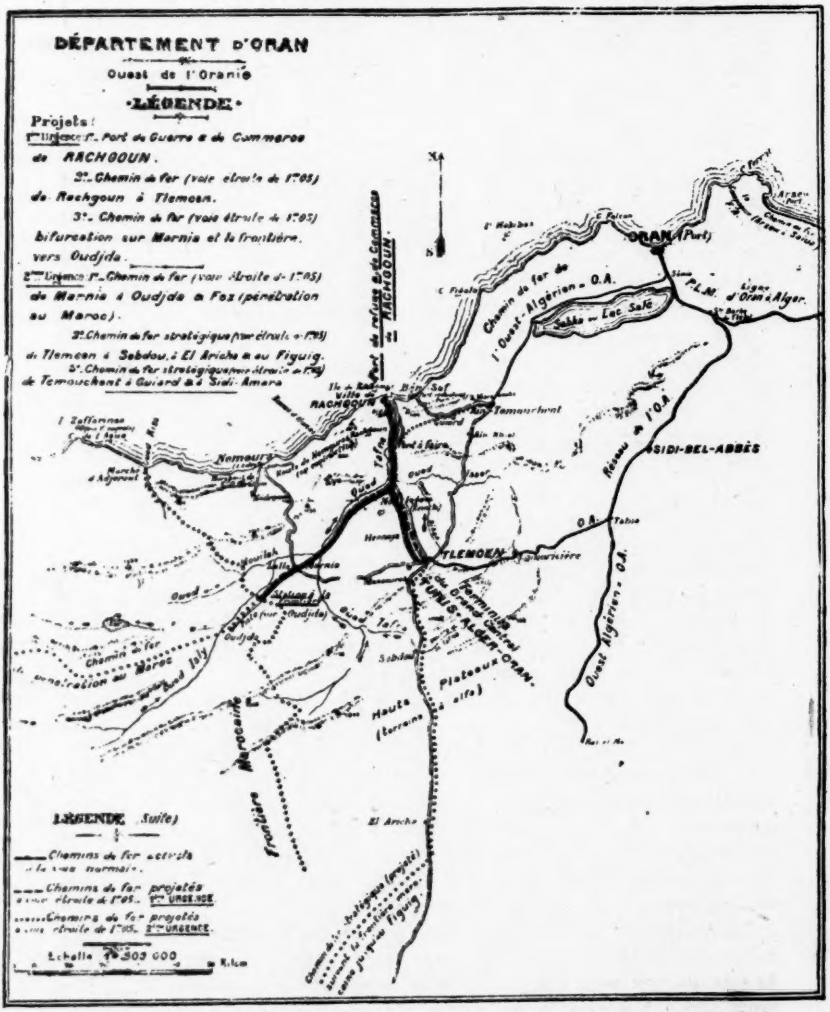
It is expected that Bizerta will play an important part in the naval history of the future. It certainly has a very commanding position in the Mediterranean, being situated where that sea narrows most between the coasts of Africa and of Sicily, on the great highway between Gibraltar and Port Said. It lies 240 miles N.W. of Malta, 420 S. of Toulon, 443 S. of Spezzia, 300 S.E. of Naples, 714 from Gibraltar, and 1,168 from the Suez Canal. All the ships making for the Suez Canal or for the Atlantic try to sight Cape Blanc, consequently pass within a short distance of Bizerta.

In a war the French may not have the command of the sea, nevertheless it is well to bear in mind that in the last war Great Britain had with France, even after the latter's fleet had been destroyed at Trafalgar, British commerce suffered considerably from the action of French privateers. A French fleet lying snugly in the waters of Bizerta could be informed by signals from the top of Djebel Remel of the approach of any commercial steamer; and nothing could prevent it sending on this information one or two fast cruisers to give chase.

It might be misleading to base our estimate of the probable performances of the French Navy in a future contest on what took place in our last war with France, for it is universally acknowledged that her naval service had been ruined by the injudicious acts of the Revolutionary Government. Neither can we form our ideas from the little the French Navy did in the war of 1870-71, because the Prussians withdrew their ships to place them under shelter, and the French, having no landing

troops with their fleet, were precluded from undertaking anything of importance. What is generally admitted in our days is that the French Navy is in a very efficient state, and is animated by a great spirit.

At the close of the nineteenth century our neighbours find themselves saddled with the protection of a colony of 390,000 square kilometres in



the north part of Africa, and have to protect the interests of a population of over four millions of souls.[1] As a set-off against the French difficulty,

[1] The French Government does not look upon Algeria as a colony, but as three provinces of the national territory.

Great Britain, which, after France, does most trade with Algeria, has a large fleet of merchantmen passing backwards and forwards in sight, we might say, of the whole of the North African coast. A most important point for one nation is to secure the protection of a long stretch of coast, for the other the safety of one of its most important trade routes.

There cannot be the least doubt that the development of the natural resources of Bizerta is a danger for England. It is all very well to say, let the French put a fleet in there and we shall shut it up in the place. This is making too sure of the result. To speak thus is very questionable taste, to say nothing that the despising of the adversary has often led to lamentable consequences. Besides, we cannot help thinking that the French Navy has thoroughly appreciated the lesson which the British admirals taught it in its last war with us, that to obtain the mastery at sea it is indispensable to keep out on the ocean, to seek the enemy and bring him to battle. To stick in port is tacitly to acknowledge the adversary's superiority, whilst it deprives the crews of every opportunity for manœuvring.

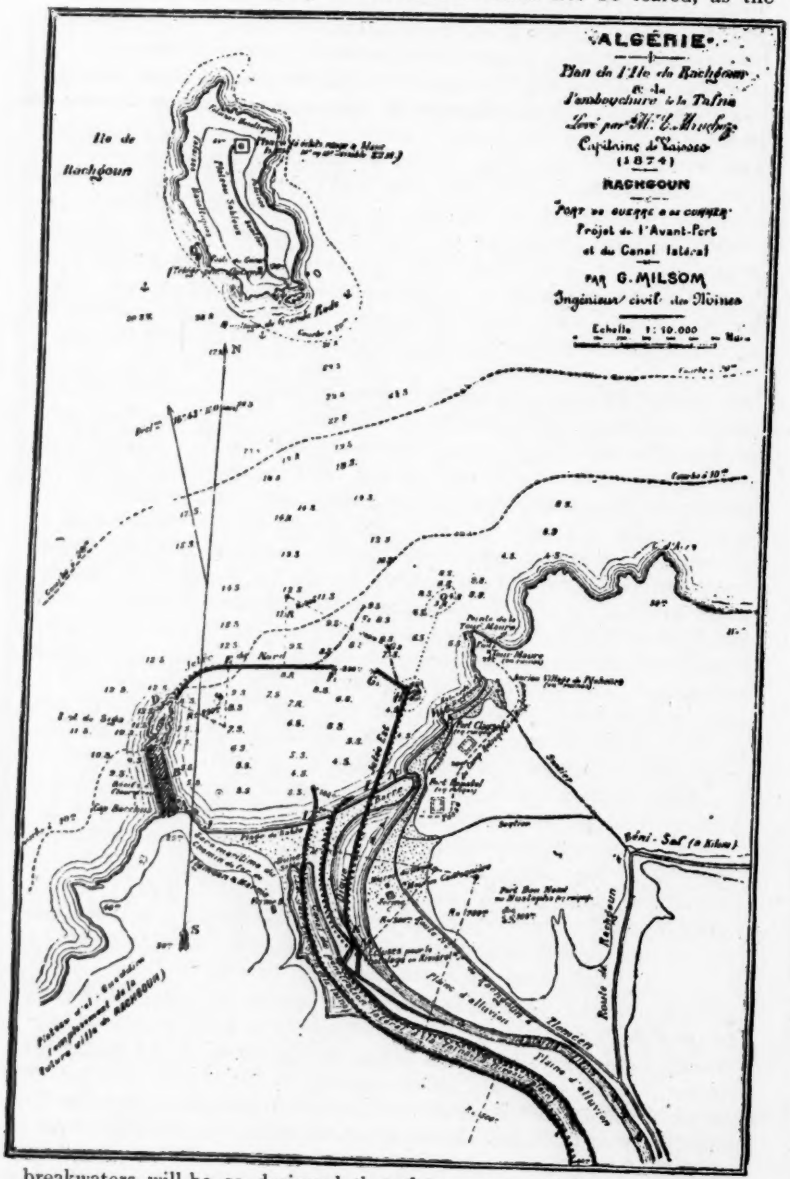
Already foreseeing a maritime war—of course, against their old rivals—the French are not satisfied with their efforts in the East, and meditate the establishment of another naval port in the West. Combined with this is a desire to discover a cheap route for their trade going to Morocco. To get their goods to reach that country at a moderate cost, it is necessary for France to have a port not far from its frontier with a short line of railway leading thereto. Neither Nemours, Beni-Saf, Oran, nor Arzen has been found well adapted for the first, and now Rachgoun, at the mouth of the river Tafna, is suggested. A naval committee is at this moment studying the question, and the possibility of creating there, at ten hours' steaming from Gibraltar, a suitable war port with an inland anchorage. The settlement of the question has been retarded by a petition made by th Municipal Council of Oran to the effect that this *port militaire* should be established at Mers-el-Kébir (the Portus Divinus of the Romans), about four miles from the city of Oran.

It is proposed to make at Rachgoun both a military harbour and a harbour of refuge, which should comprise :—

1. An outer harbour affording an easy anchorage to the fleet in time of peace.
2. A canal leading inland.
3. One or more basins constructed sufficiently far from the sea, in such positions as to afford shelter from bombardment by an enemy to a French fleet taking shelter in them.

Plans for the construction of such a harbour of refuge have been prepared by M. Milsom, the Civil Engineer of the Domain of Siga, near Rachgoun, and have been laid before the Government, as fulfilling the necessary conditions. M. Milsom utilises in his project the natural facilities which exist already at Rachgoun, and his scheme includes the construction in the Bay of Rachgoun of an outer harbour with a superficial area of fifty hectares (about five hundred thousand square yards) by means of breakwaters, which can be built at little expense in a moderate

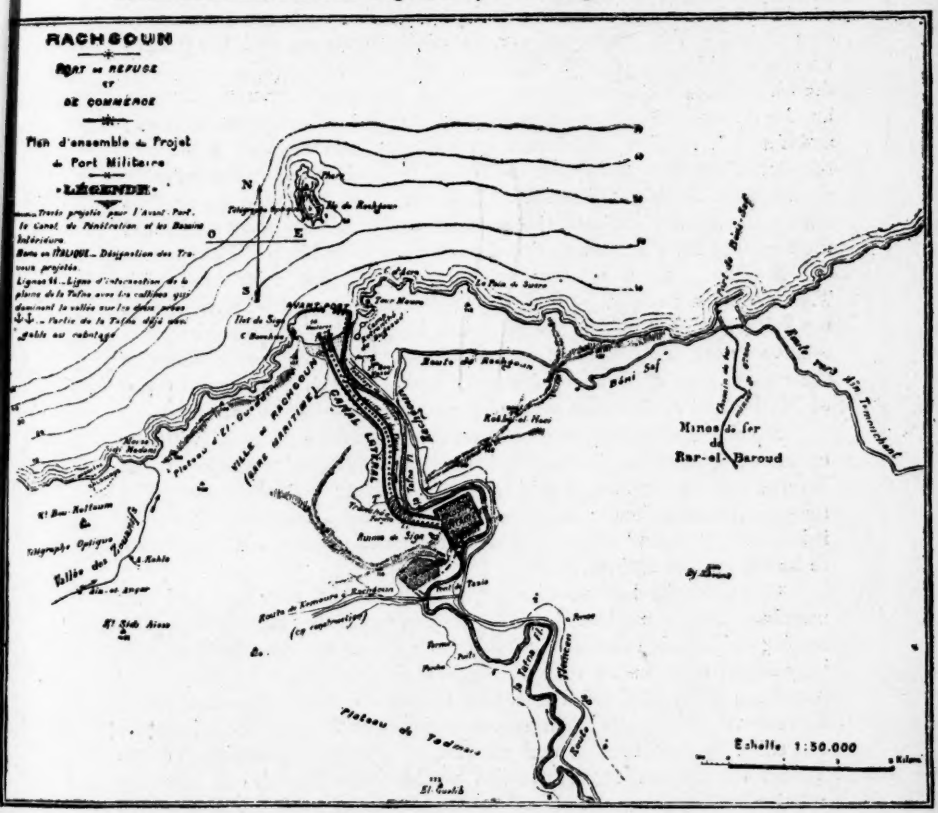
depth of water; this harbour should be dredged out to a depth of six fathoms. Any silting up of the harbour need not be feared, as the



breakwaters will be so designed that the current, which flows from the west, will sweep the mud and deposits brought down by the River Tafna

into the eastern part of the bay, while the course of the river itself will be diverted to the eastward by means of artificial banks and a special breakwater.

The canal to lead from the outer harbour inland to the proposed basin, can be constructed by using the actual course of the Tafna itself, which would have to be dredged, or by excavating it in the old bed of the



river, at present dry, in a direction parallel with its present channel; the canal would have to be some 5,000 yards long with a uniform depth of thirty-three feet. The second proposal has the advantage, that the canal could be navigated with care under any circumstances, while strong freshets often come down the Tafna, which might render navigation difficult, if not dangerous, if the river itself were used as the proposed channel.

The inner harbour or basin would also be built with a uniform depth of thirty-three feet in the peninsula situated at the foot of the ruins of the ancient Siga, and with the necessary establishments would be at a distance of some two miles and a half, as the crow flies, from the

shore, and some four miles from the Island of Rachgoun, while they would be protected from a possible bombardment by the chain of hills, which run parallel to the coast, and which are sufficiently high to prevent projectiles from touching any ships lying in the basins behind them.

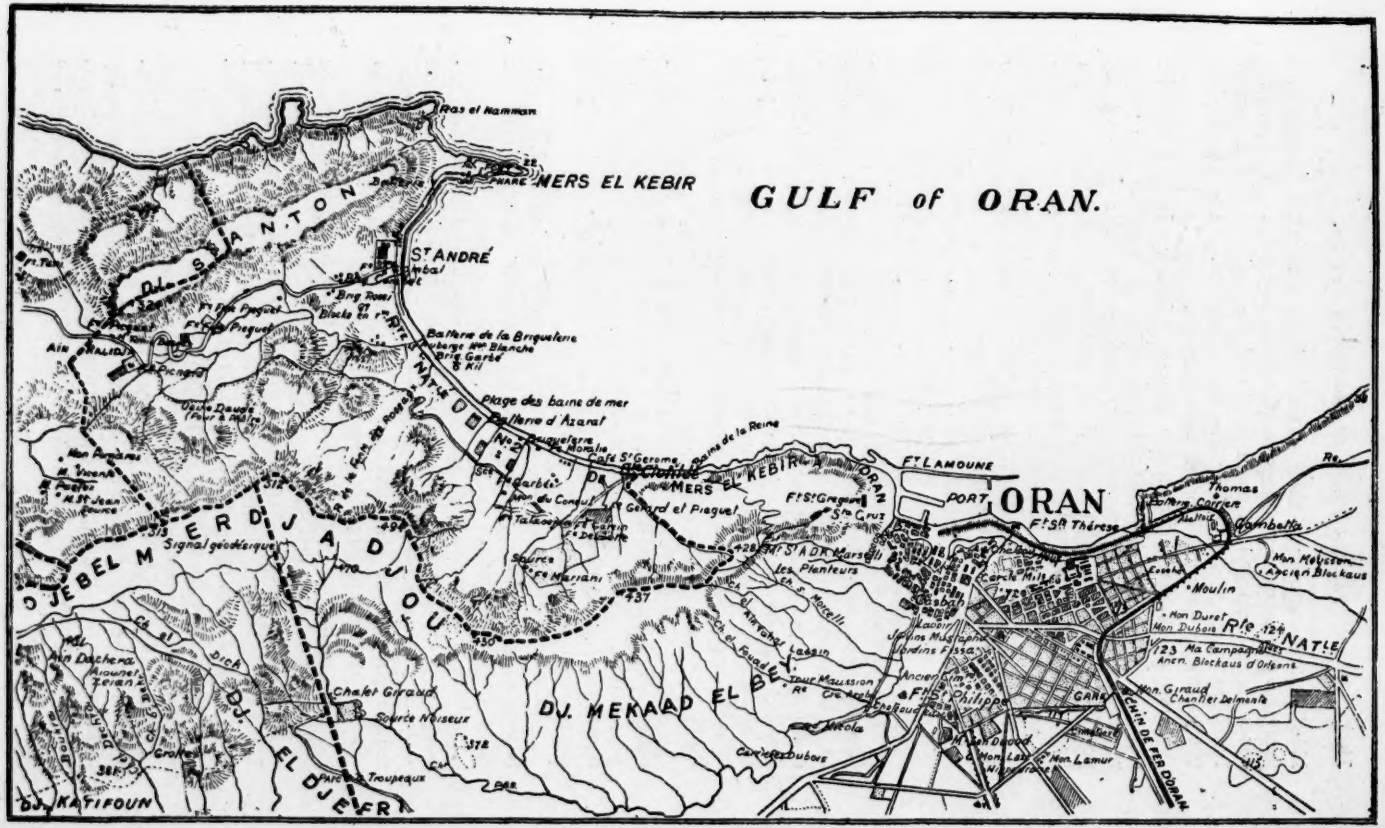
The necessary works could be carried out without any great difficulty and at a moderate cost, because the sea dredgings would be in sand or mud, and the land excavations in light soils, with but little stone or pebbles. The outer harbour, including dredging and the breakwaters, should not cost more than nine million francs, while the cost of the whole undertaking, including the inner basin with an area of three hundred thousand square yards, should not exceed fourteen millions; and for this relatively moderate sum, France would obtain a military harbour of the first rank, easy to defend by land or sea, and admirably situated as a check to Gibraltar. All the region west of Oran would thus have a commercial harbour, the want of which has long been felt, and the necessity for which was pointed out long ago by Marshal Bugeaud.

Rachgoun as a military and commercial port, connected with Tlemcen by a railway, with a branch to Marina, ought to satisfy, in the opinion of experts, all the present and future military requirements relative to the frontier of Morocco, as well as the economic needs of the region west of Oran, and should permit French commerce by way of Marina and El Archa to peacefully penetrate into Morocco.

Should it come to a war between the two nations, France, with her commanding position in the Mediterranean and with military ports at Bizerta and Rachgoun, would seriously menace British trade going through the Suez Canal; there can be no question about this. However, it is well to look and see as to which of the two nations would be likely to be the greater sufferer.

Great Britain has an alternative route to the Far East, and her merchantmen are not bound to avail themselves of the Suez Canal. The trading-ships which make use of this route are all steamers, and, though they would take longer time to reach their destination by proceeding round the Cape of Good Hope, would escape not only the canal dues, but the very high rates of insurance which would certainly be imposed on ships having to run the gauntlet of the Franco-African coast. Whilst the British merchant-ships would steam round the Cape in relative security, the canal would be entirely closed to the French, which would mean the entire stoppage of their Far Eastern Trade. All trade, moreover, between France and Algeria would be menaced by our fleets and cruisers in the Mediterranean, with naval bases at Malta and at Gibraltar, on either flank of the French colony, and this would entail a tremendous loss on both of those countries.

The present state of the Colony of Algeria will convey some idea of what effect a war would have on its trade. At this moment that colony is in anything but a prosperous condition. In 1897 the farmers were sorely tried; in the upper lands and in the south their crops suffered severely from an incursion of locusts and from drought. The scantiness of grass, the result of the absence of rain in the autumn,


GULF of ORAN.
MERS EL KEBIR
ORAN
PORT
Ras el Hamman
Batterie
PHARE
St ANDRÉ
Fort Pregent
Batterie de la Brigueterre
Auberge aux Blanches
Brig Genie
Plage des bains de mer
Batterie d'Azarat
Fort St Gerome
Fort St Grégoire
Ste Cruz
Fort Lamoune
Fort Ste Thérèse
Fort St André
Les Planteurs
Jardins Fissac
Jardins Marcelli
Jardins Laassin
Jardins Mokrani
Fort Philippe
Gare
Chemin de fer d'Oran
Mon Dubois
Mon Giraud
Mon Lamur
Mon Molveau
Ancien Blockaus
Moulin
Thomas
Lambert
Cercle Militaire
Casbah
Signal géodésique
Chalet Giraud
Source Noiseux
Source Fontaine Marianne
Ain Dachera
Arbre Zeiane
Ain Bica
Ch. de Fouad
Ch. de Mers el Kebir
Ch. de Ste Cruz
Ch. de Mostaganem
Ch. de Tafaraoui
Ch. de Gerard et Pisgat
Ch. de Mostaganem
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killed a large number of their cattle. There was much distress, and many of the native cultivators were without resources. The mother country was compelled to come in aid of the sufferers, and a loan of 1,200,000 francs was voted by the two Chambers. The year before 900,000 francs were voted for the same purpose.

Once the granary of Southern Europe, it is now admitted that the cultivation of cereals in this part of Africa is not likely to prove remunerative. Several reasons are assigned for this; amongst the principal are that the land is not deeply ploughed, that it is not enriched by fertilising manures, and that it is not cleared of noxious weeds which choke the growing corn and exhaust the soil.

Last year the total production of wine in the colony amounted to 4,367,758 hectolitres, made up as follows :—

From the province of	Algiers	2,186,289
,, ,,	Constantine ..	762,812
,, ,,	Oran	1,418,657

Out of this total, 2,923,998 hectolitres were shipped to France. Complaints are heard that this industry, which some years back promised so well, is not remunerative now that the French vineyards have been replanted with vines from the United States. With regard to quality, possibly Algerian may not compete against French wine, for it is said to be insipid or acid. This appears to be due to the fact that the fermentation of the must is affected by the temperature, which is too high.

The cultivation of plants not indigenous to the soil, such as sugar-cane, coffee, cotton, indigo, cocoa-tree, and spices, has yielded no very good results. The olive-trees are allowed to grow wild, the oranges and bananas are of indifferent quality, the cattle degenerate very soon, and the poultry is lean and tough.

An article of export which was once in great request for the manufacture of paper, the alfa fibre, is being rapidly supplanted by the adoption of wood pulp.

Much of the bad success of agriculture is attributed to the temperature, which at times is too great and at times insufficient. In general parlance the colony is under the influence of three scourges, viz., locusts, the drought, and the Jews, and of the three the second has much to do with the unsatisfactory results of agriculture.

In ancient days the Atlas mountains were covered by immense forests, which extended to the sands of the Sahara, and sheltered elephants, giraffes, and other animals now found in the centre of Africa. The Vandals began to destroy these forests, and the Arabs have continued to do so on a much larger scale. This is one of the causes assigned for the diminution of the rainfall. What rain falls, however, is not turned to account, but is allowed to run through the many *oueds* and lose itself in the sea. All over North Africa there are remains of canals and dams constructed by the ancients, and this accounts for the extraordinary fecundity of these provinces in the past. Now barely one-tenth of the territory is under cultivation. It is acknowledged that to re-wood the country, to

economise the rain, which falls in as great a quantity as in many parts of Europe, by constructing a system of dams and canals that will not allow a single drop of water to run waste, are the only measures which will bring Algeria back to the flourishing state it was in when under the rule of the Romans, as vouched by Pliny.

For all that a well-known engineer states, that what is needed to improve the country are means of communication, safe, rapid, and economical, the railways—single lines, evidently strategical routes for the speedy transport of troops—for want of sufficient traffic, have to be subsidised. The native finds the tariff exorbitant, and as to him time is not money, he prefers to adhere to the old method of animal transport.

In sixty-eight years France has spent three milliards on Algeria. There is a system of annual deficits (*insuffisances annuelles*), and matters would certainly not be improved by a war. It can be left to imagination what would be the upshot were the colony entirely isolated from the mother country, and were the principal mercantile harbours along the coast, which are quite open to bombardment—so much so, indeed, that the French call them *de vrais nids à bombes*—made to experience the resentment of the enemy. Possibly matters would be aggravated by local risings, for the native population of Algeria have already shown, in 1848 and in 1871, how ready they are to take advantage of any troubles which may disturb the peace of France. According to one of their best generals, "in Algeria, revolution is always in a latent condition," and warning notes of discontent have resounded through the land from time to time. The Semitic question has added to the difficulties of keeping the peace. Quite lately the City of Algiers was the scene of disgraceful rioting, when a feeble police, badly directed, permitted a students' demonstration to degenerate into acts of uproar and pillage. Might not the native element at any critical moment take advantage of such a state of things?

We can well conceive that no war would be so popular with the French people at the present moment as one against their old perfidious competitors across the Channel; nevertheless, if the people only knew their own interest, they would realise that no other war could be so detrimental as this to their sea commerce, to their finances, and to their colonies. It would be far different from what occurred in 1870-71; then the coasts of France were not threatened, and there were no fleets at sea to keep French merchantmen in port. It was owing to this freedom on the ocean that Gambetta was able to draw from other countries the arms, materials, and provisions he so much needed for equipping the newly-raised armies of the Loire.

Naturally, if we take things as they are, Great Britain has more power for doing damage by sea than France. The latter, nevertheless, might gain the co-operation of allies, which would greatly influence the nature of the war. At present France is very hot on the Russian alliance, and of the two nations she is by far the more enthusiastic on this point. Independently of the known fact that there exists a powerful party in the country which has never cordially approved of the Russian

alliance, who can ever tell what turn her policy may not take in the course of a few months? We do not believe that the French can persuade their present ally to join issue with them simply on a question of *amour-propre*, or of national jealousy.

The Powers in the east and centre of Europe, actuated as they are by selfish aims, might possibly stand aloof, not much grieved to see France weakening herself by engaging in such a senseless war.

Dismissing all further speculation on these possibilities, we conclude that the officials who have to guide her destinies must be well aware of all the risks involved in a war with Great Britain. We trust that they may share our opinion that real patriotism lies in calming the irritation of the people, and in trying to devise some way for making the interests of the two neighbouring nations accord. If the assertion is true that the scheme for the defence of our trade routes has been prepared, and that the plans are complete, France would have nothing to gain, but much to lose, in a trial of strength with Great Britain.

STRATEGICAL RAILWAYS.

Translated from the *Voïénnyi Sbórnik.*

THE increasing importance of railways, not only within the respective countries, but in the case of the invasion of hostile territory, has led to their being almost universally subjected to military control, and moreover to the establishment of bodies of Railway Engineers, provided with the necessary material for constructing temporary lines for supply and other purposes on the enemy's ground. In Germany, even in peace-time, all matters connected with such railways as would be used in case of war come under the direct control of the Railway Department of the General Staff, presided over conjointly by a staff officer and a civilian expert. In war-time the control passes to the Chief Inspector of Field Railways, who is under the orders of the Inspector-General of Transports at Head Quarters. In peace-time the Railway Engineers consist of the Prussian Railway Brigade, and a Bavarian Railway Battalion. The brigade comprises 3 regiments of 2 battalions of 4 companies each, 2 being Saxon and 1 Wurtemberg, and is under the direct orders of the Chief of the General Staff; the Bavarian Battalion has 3 companies and the whole 27 furnish cadres for the formation of new companies in war-time. The line from Berlin to Juterbog connecting the former with the practice grounds at the latter and Kumersdorf, is mainly intended for the training of officers and men in the practical working and construction of railways. A branch of the department is told off to watch the latest improvements in railway matters and to keep the engineers under instruction posted up in them, and also to make the necessary changes in the plans for mobilisation. The department has charge also of all the *matériel* required, except that actually taken into the field by the mobilised companies, including the iron flying bridges, the construction of which is kept strictly secret. A large stock of plant for temporary lines has been laid in; that for munitions of war being much lighter than for other supplies, and the rolling stock is intended to be drawn by horses instead of engines. The gauge in both cases is 60 centimetres (about 2 feet).

In spite of the difficulties consequent on the political structure of the Empire, almost complete homogeneity has been secured. Moreover, in 1870 only nine lines were available for mobilisation, whereas now there are sixteen with double gauge, and the Rhine can be crossed at twenty different points. As regards the eastern frontier, to which during the last ten years attention has been mainly directed, there are now eleven lines available, connected by cross lines running along the frontier. In 1870 the whole railway system had about 12,666 miles running, while in 1877 it was estimated at 30,828 miles, with 16,350 engines, or a total some two and a half times as large.

In France the strategical railways are controlled by the Chief of the Staff, subject to the supervision of the Minister of War. Here again a special section of the General Staff is told off to work out all problems connected with transport. The six principal railway companies and the State railways have a committee for military purposes consisting of an engineer in the service of the company, but subject to the control of the Minister of War, and a staff officer as military expert. There is also a central committee presided over by the Chief of the Staff, which includes the members of the lesser committees, a staff officer of artillery and one from the Minister of Marine, the Director of the Railway Department of the Ministry of Public Works, and two of his assistants — this is of course in peace-time; in war-time all railways pass under the control of the military authorities, those in and about the seat of war being subject to the orders of the commander-in-chief, and the remainder under those of the Minister of War. The two zones are of course liable to change their limits as circumstances may dictate.

The Railway Engineers comprise 1 regiment (the 5th Engineers) and 9 bodies of Railway Pioneers. The regiment has 12 companies, besides conductors, each having a peace establishment of 4 officers and 160 rank and file. The men are trained by being attached to one of the railway companies for stated periods, in addition to which 6 officers and 100 men are permanently attached to the State line from Orleans to Chartres. A telegraph battalion is in process of formation, its 6 companies comprising 168 non-commissioned officers and 432 men.

The bodies of pioneers are chosen from railway workmen liable for service, and have a military organisation even in peace-time. Each of them numbers 1,273 men. In peace-time they have charge of all the lines not belonging to the six great railway companies.

As in Germany, the field companies have all the necessary equipment and *matériel* for the construction and working of temporary lines. There is also stored at Versailles the necessary plant for working short lines where tunnels have been blown up. There is said to be a sufficiency of *matériel* for laying down narrow-gauge lines of a total length of 400 miles. The gauge is the same as in the German light railways, 60 centimetres, and the trains are to be partly drawn by horse-power. There is also a large stock of iron flying bridges, especially of the Marsille pattern. When the war of 1870 broke out, there were only three lines available for concentration, with their termini at Thionville, Nancy, and Strasburg, and these for the most part single. Now there are ten, with double gauges almost throughout, independent of one another but connected by cross lines. Efforts are being made to still further improve the system so as to carry out the plan framed by Freycinet as long ago as 1879, by which each army corps should have a double-gauge line for its sole use for the purpose of concentrating on the eastern frontier. Where the traffic is likely to be exceptionally heavy four lines of rails have been laid. Before 1870 France had 11,600 miles in working order and some 5,000 locomotives, while at the end of 1896 she had 28,000 miles and 11,000 locomotives.

In Austria-Hungary there is a Railway Department of the General Staff, the head of which in case of mobilisation has control of the railway forces in the field and accompanies the Head Quarters Staff. He then has charge of all arrangements for the transport of troops, the supply of *matériel*, and the construction of temporary lines on the enemy's territory, and the commander and two field officers of the Railway Regiment are on his staff. There is also a central railway committee in charge of the home railways, and the limits of its authority and that of the Director-General of Railways in the field are determined by the Minister of War in conjunction with the Chief of the Staff of the army in the field. The railway troops consist of a Railway and Telegraph Regiment, quartered at Korneburg on the Danube and bodies of Railway Pioneers. The regiment is for instructional purposes under the Chief of the Staff, for administrative under the Minister of War, and consists on a peace footing of 3 battalions, each of 4 companies, and 2 cadres railway and telegraph respectively. These companies have 5 officers and 117 men in peace-time, in war 244 men, and a certain number of field and mountain telegraph detachments are also formed out of them. The Pioneer Corps, as in France, are composed of the regular *employés* of the railways, and have a captain, an engineer, 5 officers qualified as station-masters, and 200 non-commissioned officers and privates for station and traffic employment. Eight such bodies are registered in peace-time, but they are not assembled for training.

The Railway Engineers have the same field equipment as in Germany. Each company has its own transport, and is followed by a train. No special provision of material of the ordinary gauge has so far been made, but it is said to be in contemplation ; but there are stores of it for the 70-centimetre gauge, each of which contains 90 kilometres of line. Trials have been made under conditions as much like those of active service as possible, when from 50 to 60 kilometres were laid with complete success. As regards bridges, after many experiments with those of the Eifel pattern, the Minister of War has decided on those of Kon, and a large stock of these has been laid in. Men and officers are trained on the line from Bainakula to Doberlin, constructed at the time of the Bosnian campaign, and since retained by the military authorities. It is worked conjointly by the military and civil staff. The chief stress has of course been laid on securing facility of concentration on the Galician frontier. There are five lines leading to that frontier, and on these and the line from Oderberg to Lemberg all arrangements have been made for the rapid entraining and detraining of troops, and the roads running from such stations as are some little distance from the frontier are kept in first-rate condition. A line has been run from Marmarosh to Ziegel and Stanislowo, and another from Menaosh to Strige, which have greatly improved the somewhat faulty communication with south-east Galicia. When these are open, seven lines will be available for concentration. In 1870 the total amount of miles in working order was 6,400, and at the end of 1896 it was 21,430, with 6,500 engines.

In Italy the railways are under the control of the Directors of Military Transports in peace-time. There is a special commission, under the presidency of the Chief of the Staff and his assistant, which has charge of all questions relating to the carriage of troops. The immediate responsibility rests, however, with the Railway Commissioners, under whom station inspectors are appointed at the principal stations. On orders being received for mobilisation, the military authorities take over the control. A directorate is appointed, consisting of artillery and engineer officers of the General Staff, and representatives of the Inspector-General of Railways and of the chief railway companies, which for the time being forms part of the Ministry of War. Its orders are carried out by the working branches of the railway companies and the stations inspectors. As soon as the concentration is completed, the lines pass once more under the control of the respective companies, and the officers and officials of the various committees are attached to the Army Service Corps in the field.

The railway troops consist of:—1. The Railway Brigade. 2. Companies furnished by the railway companies. The brigade has 4 companies, 2 for construction and 2 for working, with an establishment on a war footing of 5 officers, 240 rank and file, 20 horses, and 5 wagons. The "constructive" companies are, by agreement with one of the railways, allowed to take part in the work of construction of that particular line. The others have charge of the traffic on the line from Torre to Pellis, 7 officers and 209 rank and file being constantly employed, but the administrative and organising work is done by civilians. The four "constructive" companies supplied by the various lines are recruited from the *employés* of those lines who are liable for military service. Certain steps are taken in peace-time to form cadres for these. There are no stores worth mentioning of *matériel* or rolling stock. Experiments have lately been made with Eifel bridges and Decauville light lines.

Italy is greatly behind the other principal Powers in the matter of means of concentration. For reaching the northern frontier there are two main lines running the length of the Peninsula, one from Brindisi by Pescara and Ancona, and another from Reggio *viâ* Naples and Rome along the shores of the Adriatic and Tyrrhenian Seas. These and their branches connect the most important points in the plain of Lombardy, Novara, Milan, Verona, and Venice. A comparatively rapid concentration is thus secured on the French and Swiss as also on the Austrian frontier. The passes of the Alps are so well fortified that there is no danger of the concentration being interrupted. During the last ten years new lines have been constructed, and additional sets of rails laid down, which has materially increased the carrying power of the two companies mentioned, while the number of cross lines enables troops to be gathered at any point of the littoral threatened. The railway along the shores of Sicily has also been greatly improved. There are now 10,000 miles running in the Peninsula, as against barely 4,000 in 1870, and 3,000 engines are in use.

NAVAL NOTES.

HOME.—The following are the principal appointments which have been made: Captains—C. J. Barlow, D.S.O., to be Captain-Superintendent of Pembroke Dockyard; Sir E. Chichester, Bart., C.M.G., to "Doris" to be Principal Transport Officer in Natal; E. B. Van Koughnet, to "Doris" for transport duties at Cape Town.

General.—The first-class cruiser "Terrible" left for China on the 19th ult., *viâ* the Cape of Good Hope, and her sister ship the "Powerful," which she relieves, is also ordered home by that route; both ships were to have passed through the Canal, but presumably the uncertain state of affairs in South Africa has caused the change in their orders. The first-class cruiser "Andromeda" commissioned at Portsmouth on the 5th ult., and left for the Mediterranean on the 23rd ult. The first-class cruiser "Grafton" arrived at Plymouth from China on the 2nd ult., she will be paid off at Chatham.

The "Alecto," special service vessel, on the West Coast of Africa station, has been ordered to return to Devonport to pay out of commission. The "Alecto" is the only vessel of her type in the Navy which was specially constructed for service on the rivers of the Western Coast of Africa, where she has been continuously employed since she commissioned at Devonport in 1882. She has a novel record of service, having served no fewer than nine commissions, the unhealthy character of the river duties having necessitated the relief of each crew after two years' service. She was built in 1880-1882, at a cost of £33,336, and since then £23,450 has been spent in maintaining her efficiency. On her arrival at Devonport she is to be surveyed, but it is very unlikely that her condition will justify the expense of refitting, as the constant wear and tear to which her machinery has been subjected has rendered it almost unserviceable, besides which her armament is obsolete.

New Sloops.—The Admiralty have given orders for two new sloops to be laid down at Sheerness Dockyard. They are to be named the "Espiegle" and the "Fantôme," and will have a length of 185 feet and a displacement of 1,040 tons. They have been designed as an improvement on the "Condor" class of sloops, and will be built of steel sheathed with wood, with triple-expansion engines and water-tube boilers. They will each carry six 4-inch, four 3-pounder, and three machine guns.

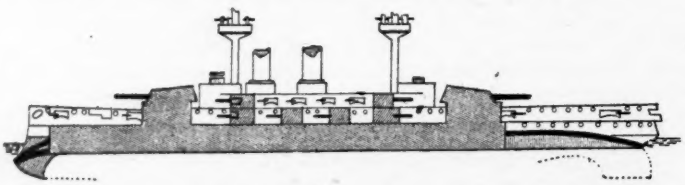
Steam Trials.—The new first-class battle-ship "Goliath" has commenced her trials. Her 30 hours' run at one-fifth power gave the following results:—Steam in boilers, 236 lbs.; vacuum, starboard 27·3 inches, port 26·3 inches; revolutions, starboard 65·8, port 65·6; I.H.P., starboard 1,467, port 1,340—total, 2,807; speed, 11·7 knots; coal consumption per I.H.P. per hour 1·73 lbs.

The new third-class cruiser "Pioneer" has completed her trials successfully. The results were as follows:—Thirty hours' coal-consumption trial—mean steam in boilers, 247 lbs.; mean revolutions, 205·8 per minute; vacuum in condensers, 25·75; mean I.H.P., 3,665; speed by log, 16·3 knots; speed for six special runs, 17·58 knots; coal consumption, 2·2 lbs. per I.H.P. per hour. Eight hours' natural-draught trial—mean steam in boilers, 262 lbs.; mean revolutions, 235·1 per minute; vacuum in condensers, 25·0; mean I.H.P., 5,263; speed, 17·7 knots. At the four hours' forced-draught trial a mean speed of 20·1 knots was attained.

The trials of the new orpedo-boat destroyer "Cheerful" have been accepted as satisfactory. At the coal-consumption trial the engines indicated 5,632-H.P., with a speed of 29·941 knots. The consumption of coal was 2·84 lbs. per I.H.P. per hour.

The first-class gun-boat "Seagull" has completed the first of her series of trials, each of 1,000 miles. She drew 9 feet 8 inches forward and 11 feet 3 inches aft. With 120 lbs. of steam in her boilers she kept up 187 revolutions, with an I.H.P. of 1,354, which gave the ship a speed of 13·2 knots.

Launches.—The new first-class battle-ship "London" was launched at Portsmouth on the 21st ult. The "London" is the pioneer ship of a new class designed by Sir W. H. White, Director of Naval Construction, of which three are being built in the dockyards at Portsmouth, Chatham, and Devonport, of interest chiefly because of their armour system. They are described as improved "Formidables," but have the same dimensions, viz. :—Length between perpendiculars, 400 feet; length over all, about 430 feet; beam, 75 feet; displacement, 15,000 tons; mean draught, 26 feet 9 inches. The "London" will be propelled by twin screws, each actuated by a set of triple-expansion engines of 7,500-I.H.P., and the steam will be supplied by 20 independent water-tube boilers of the Belleville type, fitted with all the latest improvements, and capable of supplying steam at 300-lb. pressure, which will be reduced at the engines to 250 lbs. The engines and boilers are being built by Earle's Shipbuilding and Engineering Co., Ltd., Hull. The amount of coal carried at the above draught is 900 tons, although provision is made for the stowage of 2,100 tons. The side armour is 9 inches thick and 15 feet deep, as in the "Formidable," but, whereas the armour in the "Formidable" extends for a length of 216 feet amidships, in the "London" and her sisters it will be continued with a gradual reduction in thickness right forward to meet the 2-inch special plating on the bow, and will be treated by the improved Harveyized process. An athwartships armoured bulkhead will be fitted at the after end of the side armour, varying in thickness from 9 inches to 12 inches, but forward there will be no armoured bulkhead, owing to the extension of the side armour. The middle deck, on which the armour rests, is of the now usual turtle-backed shape, and is formed of 2 inches of plating on the slopes and 1 inch on the flat part. It is difficult to understand the reason for the omission of the fore armoured bulkhead, especially as in the "Shikishima," where the armour is similarly carried forward, it has been possible to give one.



PROFILE OF H.M.S. "LONDON." [*From the "Engineer."*

The main armament consists of four 12-inch B.L. wire guns of a new and improved type, mounted in pairs, two firing forward and two aft. They are protected by a strong shield 8 inches in thickness, and the hydraulic mechanism and machinery by a circular redoubt, protected by only 12-inch steel armour, as against 14-inch in the "Majestic" class. The auxiliary armament is formed mainly by twelve 6-inch Q.F. guns of a new type, eight on the main deck and four on the upper deck. Four of these can be fired right ahead and four right astern, and each of these guns is enclosed in a casemate of 6-inch Harveyized steel. The ammunition is sent up through an armoured tube,

and is under protection from the time it leaves the magazines. In addition, sixteen 12-pounder Q.F. guns will be fitted, eight on the main deck and eight on the upper deck. Two 12-pounder 8-cwt. guns for boat and field service will also be supplied and fitted with fighting positions in the ship. In the two fighting tops six 3-pounder guns will be mounted for protection against torpedo attack. There are eight Maxim guns in addition to the usual rifles, etc. Four submerged torpedo-tubes 18 inches in diameter, two forward and two aft, will be fitted. A conspicuous feature of this ship is a formidable ram, which is a steel casting weighing over 35 tons, and as a protection for the ship whilst using the ram the sides forward are partly covered with 2-inch plating in addition to the ordinary skin plating. The structure of the ship is well designed to prevent any serious injury arising from the use of the ram. The "London" will be fitted with two steel masts, each carrying a military or fighting top and a search-light platform. A long-distance semaphore, 160 feet above the water-line, for signalling at sea, will be fitted at the head of the main topmast. The masts are provided with three derricks, two forward and one on the mainmast, and these derricks, primarily fitted for hoisting out the boats, will be of great utility when coaling. The vessel will carry four steamboats, two 56 feet in length and two 40 feet in length, and 13 sailing and pulling boats, ranging from a 42-foot sailing launch to a small dinghy. The two larger boats, which are capable of steaming at about 13·5 knots, are fitted with torpedo dropping apparatus.

Two years ago the sensation of the Naval Jubilee Review at Spithead was the marvellous performance of the "Turbinia," a little craft which steamed through the lines of the assembled squadrons at a speed of 30 knots an hour. The results attained by the "Turbinia" were such that the Admiralty decided on having a similar vessel built for experimental purposes. The order for this vessel was placed with Hawthorn, Leslie & Co., of Newcastle-on-Tyne, with instructions that the vessel should be fitted with engines on the turbine principle by Parson's Steam Turbine Co. The "Viper," as the new vessel is called, was launched on the 6th ult., and is now at Messrs. Parson's works having the turbines placed on board. The propelling machinery consists of four steam turbines, each driving a separate shaft fitted with two propellers of 3 feet 4 inches diameter, and 4 feet 6 inches pitch. The speed of the turbines at the maximum power will be 1,000 revolutions per minute. Steam is to be supplied by four Yarrow water-tube boilers. The "Viper" has her boilers and shafting already on board, and may be expected to commence her trials early in November. She has a length of 210 feet, with 21 feet beam, and is built on lines which are an exact copy of the destroyer "Mermaid," which recently attained a mean speed of 30·9 knots on a three hours' trial. The contractors of the "Viper" are not bound either as to speed or power, but it is estimated by her designers that she will attain a speed of 35 knots an hour. This is not only the fastest rate of steaming ever attempted, but it is actually at the rate of 40 land miles an hour. When she has undergone her contract trials the "Viper" will be sent to Devonport to complete for sea.

The Mediterranean Squadron Regatta.—We have not up to the present taken notice of the different squadron regattas, but as they excite great interest on the different stations we propose to give the results for the future, as they may be useful for purposes of reference.

The Mediterranean Fleet regatta took place at Aranchi Bay, in Sardinia, on September 4th and 5th. The fleet consisted of eight battle-ships, three cruisers, one gun-vessel, and four torpedo-boat destroyers, consequently there was plenty of competition. The entries were numerous and the rowing good. The arrangements were admirably carried out by a committee, under the direction of the captain of the "Revenge" (flag-ship of Sir Gerard Noel). A distinction has to be drawn between boats built in England and those at Malta, the latter being better pulling boats than the former. Prizes were given to the winners in each,

class, provided there were sufficient entries. The results were decided by the number of points won by each ship, a first prize counting three points, a second two points, and a third one point. The "Renown," which only arrived from Genoa with Sir John Fisher, the new Commander-in-Chief, on the morning of the first day's programme, commenced the regatta by winning the first race with her five-oared whaler gig, a boat built at Halifax, and which has already distinguished herself by winning the Gibraltar cup. The first prize for English boats in this race was taken by the "Venus." The boats of the "Ramillies" won a total of 45 points in the regatta, consisting of ten first prizes, six seconds, and three thirds. No other vessel came anywhere near this record, the next being the "Empress of India," whose boats obtained 25 points, the "Illustrious" 24, "Cæsar" 23, "Renown" 18, "Revenge" 11, and so on down to the "Harrier," whose crew secured one first prize, equal to three points. Some of the races were exceedingly close. The launch of the "Revenge," manned by 36 men, took the prize in the launches race, the "Cæsar" won the officers' galley race, and the "Ramillies" the junior officers' galley race. The race for all-comers was won by the "Empress of India's" gig, double-banked; the "Cæsar's" gig being second, and the "Revenge's" launch third. In this race the gig of the "Ramillies," pulling 16 oars, had the misfortune to break an outrigger early in the race; she, however, came in fourth out of a numerous entry. Results :—

First Day.

Four and five-oared whalers and gigs, racing crews, Maltese boats—1, "Renown"; 2, "Empress of India"; 3, "Cæsar." English boats—1, "Venus"; 2, "Banshee"; 3, "Cæsar."

Twelve-oared cutters, boys, Maltese boats—1, "Ramillies"; 2, "Empress of India"; 3, "Anson." English boats—1, "Illustrious"; 2, "Isis."

Six-oared galleys, racing crews, Maltese boats—1, "Ramillies"; 2, "Hood"; 3, "Ramillies." English boats—1, "Cæsar."

Four or five-oared whalers and gigs, stokers, Maltese boats—1, "Ramillies"; 2, "Empress of India"; 3, "Renown."

Twelve-oared cutters, Marines, Maltese boats—1, "Empress of India"; 2, "Ramillies"; 3, "Hood." English boats—1, "Illustrious"; 2, "Dido."

Fourteen-oared cutters, racing crews, English boats—1, "Cæsar"; 2, "Dido."

Pinnaces, racing crews—1, "Renown"; 2, "Empress of India"; 3, "Illustrious."

Four or five-oared whalers, signalmen, Maltese boats—1, "Ramillies"; 2, "Illustrious"; 3, "Revenge." English boats—1, "Thetis."

Five or six-oared galleys, working daymen and carpenters, not seaman class, Maltese boats—1, "Ramillies."

Dinghies and skiff dinghies—1, "Hood"; 2, "Ramillies" and "Revenge," dead heat.

Twelve-oared cutters, racing crews, Maltese boats—1, "Ramillies"; 2, "Empress of India." English boats—1, "Illustrious"; 2, "Isis."

Ten-oared cutters, racing crews, Maltese boats—1, "Anson." English boats—1, "Thetis."

Launches—1, "Revenge."

Five and six-oared galley, gun-room sub-officers—1, "Ramillies"; 2, "Renown"; 3, "Cæsar."

Berthon boats, torpedo-boat destroyers—1 and 2, "Banshee."

Second Day.

Five or six-oared galleys, C.P.O.'s, Maltese boats—1, "Venus"; 2, "Ramillies."

Four or five-oared whalers and gigs, Marines, Maltese boats—1, "Renown"; 2, "Cæsar"; 3, "Empress of India."

Twelve-oared cutters, duty crews, Maltese boats—1, "Ramillies"; 2, "Anson"; 3, "Venus." English boats—1, "Illustrious"; 2, "Renown"; 3, "Revenge."

Five or six-oared galleys, officers—1, "Cæsar"; 2, "Renown"; 3, "Ramillies."

Gigs or whalers, under 27 feet, English—1, "Banshee."

Five or six-oared galleys, excused daymen and band—1, "Revenge"; 2, "Empress of India"; 3, "Ramillies."

Fourteen-oared cutters, duty crews, English boats—1, "Cæsar"; 2, "Illustrious."

Four or five-oared whalers and gigs, duty crew, Maltese boats—1, "Empress of India"; 2, "Ramillies"; 3, "Revenge." English—1, "Harrier."

Twelve-oared cutters, stokers—1, "Ramillies"; 2, "Empress of India"; 3, "Hood." English—1, "Illustrious."

Four or five-oared whalers and gigs, boys. Maltese—1, "Ramillies"; 2, "Renown"; 3, "Revenge." English—1, "Isis."

Skiffs, officers—1, "Illustrious"; 2, "Ramillies"; 3, "Empress of India."

All-comers—1, "Empress of India's" gig; 2, "Cæsar's" gig; 3, "Revenge's" launch.

Special race for Berthon boats, instead of race for all stokers or seamen—1, "Banshee," stokers; 2, "Banshee," seamen.

—*Times, Naval and Military Record, and other sources.*

FRANCE.—The following are the principal promotions and appointments which have been made: Vice-Admirals—P. M. Ménard to command of Northern Squadron; C. De La Bonninnière de Beaumont to command of 3rd Arrondissement (Lorient). Rear-Admiral—C. H. Godin to Vice-Admiral. Capitaines de Vaisseau—H. A. Boutet to Rear-Admiral; C. A. St. Paul de Sainçay to "Charlemagne"; M. A. Huguet to "Amiral-Baudin." Capitaines de Frégate—E. A. Jacquet to "Condor"; E. P. Pourquier to command of Algerian *Défense-Mobile;* H. B. Pugibet to "Calédonien"; P. A. C. Ortolan to command of *Défense-Mobile* at Rochefort.—*Le Journal Officiel de la République Française.*

Personal.—Vice-Admiral C. Sallandrouze de Lamornaix, the Commander-in-Chief of the French Northern or Channel Squadron, died suddenly from heart disease, on board his flag-ship, the "Formidable," in Cherbourg Harbour, on the 18th ult., at the age of fifty-nine. The deceased officer, who had just completed his general inspection of the squadron, and who had been drawing up an interesting programme of scouting exercises for the forthcoming cruise of the squadron, was a very popular officer, and his death came as a great shock to the whole fleet. He had made a practice on his inspections of taking each ship to sea, and witnessing for himself the efficiency of the crew at target practice; the target was towed by one of the fast torpedo-vessels of the squadron at a high rate of speed. His successor is Vice-Admiral Ménard, whose place as Maritime Prefect of Lorient is taken by Vice-Admiral De La Bonninnière de Beaumont, lately in command of the squadron in China.

The following honours were paid by the squadron to the body of the deceased Admiral, when removed from the flag-ship to the shore for conveyance to Paris. At 9 a.m., on a signal from the "Formidable," the crews of the squadron manned ship, and on board the "Formidable" as the coffin was brought up caps were taken off and the guard presented arms. The coffin was placed in the admiral's barge and towed by a steam-boat, and on shoving off a salute of 19 guns was fired by the "Formidable," the admiral's flag was struck, and three volleys fired by the landing parties mustered on deck. A procession of boats followed the barge with the late admiral's family, the chief authorities of the port, and 500 men of the

fleet, and on being landed the coffin was received by the clergy of Cherbourg and placed on a funeral car; a procession was then formed and moved off for the station, the coffin being preceded by a petty officer carrying the late admiral's decorations on a cushion.

General.—The orders for the first-class battle-ship "Charlemagne" have again been altered; having completed her full complement from the second-class battle-ship "Courbet," she has been temporarily attached to the Squadron of the North in place of that ship, while certain work, which will require some three months to carry out, is taken in hand, but she will probably remain with the squadron until the "Courbet," which has been placed in the dockyard hands at Brest for the changes in her armament, is ready to rejoin. Exception is taken in naval circles to the excessive size of her superstructure, a fault common to all French battle-ships, and from which the constructors do not seem able to free themselves. The "Saint-Louis," a sister ship, is now nearly ready for her trials at Lorient; if the preliminary ones are successful, she is to proceed to Toulon, where the official ones will be carried out, and when these are completed she is to be attached to the Mediterranean Squadron.

The second class battle-ship "Devastation" is now not to be placed in the dockyard hands for the change in her armament and to have her new boilers until the spring, when the first-class battle-ship "Hoche" will be ready to take her place in the Squadron of the North. The first-class battle-ship "Neptune," which forms one of the Instructional Squadron in the Mediterranean, is to be placed in the dockyard hands at Toulon, her place in the squadron being taken by the first-class battle-ship "Amiral-Baudin." Both the "Neptune" and "Devastation" are to be fitted with Belleville boilers. The first-class battle-ship "Bouvet," quite a new ship, has been taken into the dockyard hands at Toulon for important repairs, as it has been found that the beds of her engines are far too weak to stand the immense pressure upon them; it is not known how long the defects will take to make good. It is believed that the gunnery and torpedo-schools will once more be retransferred to the "Couronne" and "Algéciras" respectively, as the two first-class battle-ships "Marceau" and "Magenta," which are now serving as school-ships are not suitable for the work, they not having the proper accommodation for officers and men under training, nor the necessary fittings. It is further reported that the three battle-ships forming the Instructional Division will at the same time be paid off into the 2nd Category of the Reserve at Toulon, thus reducing the strength of the Mediterranean Fleet by three ships.

The squadron forming the Superior School of the Navy arrived at Brest on the 25th ult., and the ships are to be placed in the 2nd Category of the Reserve—the first-class armoured cruiser "Amiral-Charner" and the second-class cruiser "Friant" at Brest, and the third vessel, the second-class cruiser "Davout," at Rochefort. It would appear that the École Supérieure de la Marine is not very popular with officers of the French Navy, as the Minister of Marine has issued a circular calling for a report from the maritime prefects on the causes of the lack of candidates for entry therein.

The new torpedo-boat destroyer "La Hire" has completed her trials; she was to have proceeded to strengthen the Mediterranean Fleet, but she is now to take the place of the torpedo-aviso "Fleurus," whose boilers have again broken down, in the Squadron of the North.

Some fresh experiments with the submarine boat "Goubet" No. 2 have been carried out at Toulon, where she was conveyed by rail from Sant-Ouen. A commission has been appointed to report on her. This submarine boat was tried before a commission, of which Admiral Gervaise was president in 1891, who reported that though she was habitable, and could be made to sink to any required depth when at rest, that as a submarine boat she was not

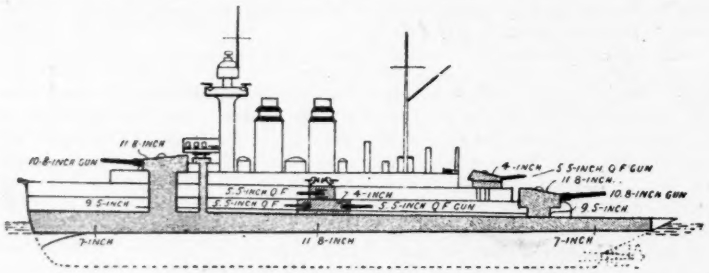
navigable as when an attempt was made to steer her under water for a given point she re-appeared at the surface in quite another direction, and proved herself altogether unreliable. Apparently the inventor has made some alterations, which are to be tried before the newly-appointed commission, or it is suggested that she may be utilised for harbour defence as a submarine torpedo discharging station. The trials seem to have been successful, the boat diving and returning to the surface as desired, without difficulty or any mishap.

Launches.—The third-class cruiser "Infernet" was launched from the Chantiers de la Gironde at Bordeaux on the 7th ult. Her dimensions are as follows:—Length, 311 feet; beam, 39 feet; displacement, 2,460 tons; with a mean draught of 15 feet 6 inches. Unlike the larger number of French cruisers, the "Infernet" has a nearly straight stem, while her stern above water comes to a sharp point. There will be four groups of water-tube boilers on the Normand system, which have been constructed at the Creusot works; the boilers, eight in number, containing 8,112 tubes, will be in four stokeholds. The engines, of the usual triple-expansion type, with four cylinders, are to develop 8,500-I.H.P. under forced draught, which, with 175 revolutions, are to give a speed of 21 knots; the engines will be placed in separate compartments, divided by a water-tight bulkhead. The armament will consist of two 140-millimetre (5·4-inch) Q.F. guns, four 100-millimetre (3·9-inch) Q.F. guns, with eight 3-pounders; the two 5·4-inch guns being mounted one forward and one aft; the 3·9-inch guns being in sponsons on the broadside; and the 3-pounders, six on the spar-deck and two under the poop; the ship also carries fourteen electro-automatic torpedoes, fitted with a special releasing attachment, permitting of their being discharged with great rapidity. As is their custom with small vessels, the builders have launched the ship with the engines and boilers in place, so that the ship is almost in condition to make her preliminary trials, after which she will proceed to Rochefort, for her official ones. She was commissioned on the 9th December, 1896. There are at present under construction at the same yard the first-class armoured cruiser "Kléber" and torpedo-boats Nos. 239, 240, and 241.

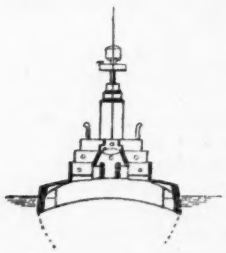
On Wednesday, 20th ult., the new first-class armoured cruiser "Amiral-Gueydon" was launched from the Government yard at Lorient. Her dimensions are as follows:—Length, 452 feet 9 inches; beam, 63 feet 8 inches; displacement, 9,517 tons; with a draught of 24 feet 7 inches. She will have three screws, and her engines are to develop 20,000-I.H.P., giving a speed of 21 knots under forced draught. The normal coal stowage is 1,020 tons, but she can carry 1,600 tons. In the first case she has a radius of action of 1,230 miles at full speed, and 6,500 miles at 10 knots; with her full coal stowage, her radius of action is 1,920 miles at full and 10,300 at 10 knots speed. Her boilers will be of the Niclausse water-tube type. She will have a water-line belt of 6·8-inch hardened steel, tapering at the extremities to 3·5 inches, with a belt above 3·5 inches thick reaching to the main deck, while the guns will be protected by 8-inch armour on the turrets for the two heavy ones, and 3·8-inch armour on the casemates for the secondary battery. The armament will consist of two 19·4-centimetre (7·6-inch) guns in the turrets, one forward and one aft; eight 16·4-centimetre (6·4-inch) Q.F. guns in casemates; four 10-centimetre (3·9-inch) Q.F., and sixteen 3 and 1-pounder Q.F. guns, with two submerged torpedo-tubes. The ship is to be completed by the end of 1901, the order for her construction having been given on the 13th August, 1897.—*Le Temps* and *Le Yacht.*

The new second-class battle-ship "Henri IV.," which was launched at Cherbourg on the 23rd August last, is a vessel of a new and decidedly interesting type; although an experimental ship, great things are expected from her, and should she prove a success it is quite possible that she will be the model for the future French battle-ship. We have called her a new type, as a matter of fact she is a combination of older types, and embodies, among

other points, one feature, which, although new as far as French naval construction is concerned, is to be found in the "Inflexible," "Ajax," "Agamemnon," "Colossus," and "Edinburgh," and that is, that the sides directly they leave the immediate bow no longer follow the water-line, but a straight line fore and aft inboard, forming a narrow superstructure as compared with the full beam of the ship. In England this feature disappeared with the low freeboard, which was definitely abandoned for battle-ships when the "Royal Sovereign" and her sisters were designed, as the type for the future, some twelve years ago; but the French designers seem to imagine that the idea is new and has never been properly tried, claiming that in the "Henry IV.," her decks being quite open, she has nothing to fear in action from water finding its way on to the lower deck, it can run where it chooses. This however was the case with the "Inflexible" and other vessels of that class, but those ships were not looked upon with any greater favour in consequence of it.



EXTERNAL PROFILE OF "HENRI IV."



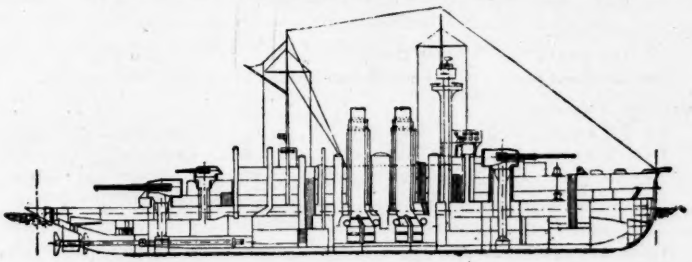
FORWARD SECTION OF "HENRI IV."

The "Henri IV." is intended to be an improvement on the coast-defence vessels of the "Bouvines" class. The first vessels of the type were the "Valmy" and "Jemmapes," which are low freeboard ships, completely belted, with a heavy gun in a turret forward and another aft, with a superstructure between; these vessels proved to be bad sea-boats, so the next two, the "Bouvines" and the "Amiral-Tréhouart," were built with raised forecastles, the foremost turret being proportionately raised to enable the gun to fire over it. The following are the dimensions of the "Henri IV." and "Bouvines":—

	"Henri IV."	"Bouvines."
Length	350 feet.	292 feet.
Beam	73 feet.	59 feet.
Displacement	9,000 tons	6,610 tons.

Like the "Bouvines" the "Henri IV." has a high forecastle, but there the resemblance in the hull ceases, the sides of the later ship being brought in, as

already described; from where the forecastle ceases the freeboard is very small, especially aft, where it is only 3 feet 6 inches out of the water. She will have a complete water-line belt of Harveyized steel, except for a few feet right aft, where a bulkhead athwartships takes the place of the side armour, following the sharp V shape of the stern; the thickness of the belt tapers from 11·8 inches amidships to 7 inches at the extremities. Above the belt is an armoured deck 2·2 inches thick, and there is a curved armoured deck in addition below, so that there is a total thickness of armoured deck of about 3 inches; below the belt is another armoured deck of 1 inch hardened steel. Above the armoured lower deck are three other decks in the superstructure amidships, which may be termed the main, the upper, and the flying decks. Between the lower and main deck amidships is a central redoubt protected by 4-inch steel armour, with a somewhat smaller casemate above it, similarly protected; in these redoubts will be carried the secondary armament, with the exception of one gun which will be mounted in a small turret on the after part of the upper deck, which from this position will be able to fire over the after heavy gun, this turret will also be protected by 4-inch steel armour. It does not appear that any other part of the upper works above the belt is to be protected by armour, and should this not be done great havoc will be wrought by shells, as the exposed portions present a considerable target. The turrets for the heavy guns, one forward and one aft, with the



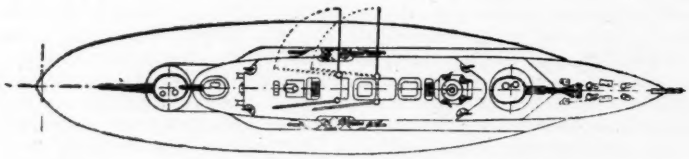
LONGITUDINAL SECTION OF "HENRI IV."

supporting tubes, will be protected by steel armour 9·5 inches thick, with steel hoods for the guns 11·8 inches thick; all the armour will be hardened after the Harvey patent. The armament will consist of two 27·4-centimetre (10·8-inch) guns, one being mounted in each turret, and of seven 13·8-centimetre (5·5-inch) Q.F. guns, of which four will be mounted in the lower casemate, two in the upper, and the seventh in the small turret aft on upper deck, and there are twelve 3-pounders distributed over the superstructure. All the turrets and ammunition hoists will be worked by electricity.

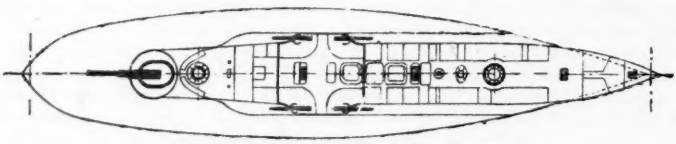
The engines, to develop 12,000-I.H.P., are expected to give a speed of 17 knots, and are being made at the Indret Engine Works; while the boilers will be on the Niclausse water-tube system and will be divided into four groups, placed two and two before and abaft the transverse bulkheads. There will be three screws and the engines will be in separate compartments divided off by water-tight bulkheads. The normal coal supply will be 725 tons, but if necessary 1,100 tons can be carried, which will give the ship a radius of action of 7,500 miles at 10 knots speed.

Many complaints are made in England about the small armament, as compared with their displacement, which their battle-ships and cruisers carry, but the armament of many of the French ships is even lighter, as in the case of the "Henri IV." There is no English ship of about her tonnage with which she can

be compared, but her armament is certainly much lighter than that of either of the two Russian ships, the "Rotislav" and "Cissoi Velikie," both of which are near her displacement but some 500 tons smaller.



SUPERSTRUCTURE PLAN OF "HENRI IV."



UPPER DECK PLAN OF "HENRI IV."

Main Armament—		
"Henri IV."	"Cissoi Velikie."	"Rotislav."
Two 10·8-inch guns.	Four 12-inch guns.	Four 10-inch guns.
Secondary Armament—		
Seven 5·5-inch Q.F. guns.	Six 6-inch Q.F. guns.	Eight 6-inch Q.F. guns.
Twelve 3-pounder Q.F. guns.	Thirty-two 3 and 1·8-pounder Q.F. guns.	Twenty-eight 3 and 1·8-pounder Q.F. guns.

—*Le Yacht and other sources.*

JAPAN. — *Launches.* — The new first-class armoured cruiser "Idzumo" was launched from the shipbuilding yard of Sir W. G. Armstrong, Whitworth & Co., at Elswick, on the 20th ult. Her dimensions are as follows:—Length between perpendiculars, 400 feet; beam, 68 feet 6 inches; depth, 41 feet; draught, 24 feet 3 inches; displacement, 9,750 tons. The armament consists of four 8-inch B.L. guns twin-mounted in barbettes, fourteen 6-inch Q.F. guns—ten in casemates—six on the main deck and four on the upper deck, the remaining four being on the upper deck protected by shields; seventeen 12-pounder Q.F. guns—eight on the shelter decks, two on the main deck forward, four on the bulwarks, and three in the military tops; four submerged torpedo-tubes—two forward and two aft. The vessel has a complete water-line belt of Harveyized nickel-steel armour 7 inches thick amidships, reduced at the ends. Above this there is a citadel of 5-inch Harveyized nickel-steel armour enclosing the bases of the barbettes, and carried from the top of the water-line belt to the main deck. The barbettes are of Harveyized nickel-steel 6 inches thick, the casemates are of nickel steel 6 inches thick, and the conning tower is Harveyized nickel steel 14 inches thick. The machinery is of the twin-screw vertical triple-expansion type, to develop 14,500-I.H.P., and the speed guaranteed is 20¾ knots, the boilers being of the Belleville latest type. She has a bunker capacity for about 1,600 tons of coal. Accommodation is provided for an admiral, 52 officers, and 430 petty officers and men. The "Idzumo" is a sister ship to the "Asama" and "Tokiwa," which have been already launched by the same firm.

The 30-knot torpedo-boat destroyer "Kagerou," which was launched from the yard of Messrs. John I. Thornycroft & Co., of Chiswick, on the 23rd August, is the fifth torpedo-boat destroyer constructed by Messrs. Thornycroft & Co. for

the Japanese Government, her dimensions being :—Length, 210 feet ; beam, 19 feet 6 inches. With the exception of her armament the "Kagerou" is somewhat similar to the British destroyers. She was launched complete with machinery on board.—*Times.*

THE NETHERLANDS.—The Naval Estimates for 1899 amount to 15,890,424 Dutch gulden (£1,324,202) ; the following are some of the principal items :—

	Gulden.
Administrative Expenses	364,344 (£30,362)
Material and Ship Construction	6,812,410 (£567,701)
Pay	4,227,318 (£352,277)
Pilotage and Hydrographical Services	2,427,983 (£202,332)
Pensions, Half-pay, etc.	1,998,369 (£166,531)

As compared with the previous year, the Estimates show an increase of 337,949 gulden (£28,163).

In the vote for *matériel* 585,610 gulden (£48,801) are required for new guns ; 47,100 gulden (£3,925) for machinery for ships ; and 75,000 gulden (£6,250) for coal. For new constructions and fitting out of new ships, including their gun and torpedo armaments, a vote of 4,200,000 gulden (£350,004) is demanded, which is an excess of 16,350 gulden (£1,363) over the sum voted in last year's budget. For the commissioning and fitting out of reserve ships a sum of 149,500 gulden (£12,458) is required.

A new battle-ship of the type "Koningin Regentes" is to be laid down at Rotterdam, and a first vote of 100,000 gulden (£8,334) is to be set aside for her. The second-class cruiser "Utrecht" is to be completed this year, and the new battle-ship "Koningin Regentes" is to be pushed on. The two new second-class cruisers "Gelderland" and "Noord-Brabant," building by private firms, are to be completed and delivered ; while the repairs to the boilers and engines of the cruiser "Koningin Wilhemina der Nederlanden," commenced last year, are to be finished this, when the ship will be commissioned for service with the Auxiliary Squadron in the Dutch East Indies.

The frigate "Tromp" is to proceed to the East Indies, and the corvette "Alkmaar" on her return from the West Indies is to be taken in hand in readiness for a new cruise, as well as the training-ship "Nautilus" on her arrival home.

The following ships have been commissioned for service for this year :—

The East Indian Squadron :—

An Auxiliary Squadron consisting of the battle-ship "Prins Hendrik der Nederlanden," the second-class cruisers "Holland" and "Friesland," and a frigate of the "Atjeh" type.

For the East Indian Local Naval Force :—

The armoured gun-boat "Sumatra," the despatch-vessels "Java" and "Borneo," with nine smaller vessels and the torpedo-boat "Cerebus."

For the West Indies :—

The corvette "Somelsdijk" and the schooner "Suriname."

For General Foreign Service :—

The frigates "Atjeh," "Ruyter," and "Tromp" ; the second-class cruisers "Koningin Wilhelmina der Nederlanden," "Utrecht," and "Zeeland," and the training-ship "Nautilus."

For Fishery Service :—

The gun-boats "Zeehond," "Dolfijn," and "Argus."

The frigate "Johan Willem Friso" and the despatch-vessel "Valle" have been struck off the active list of the fleet.

The new battle-ship is to be laid down at Rotterdam; her dimensions will be as follows:—Length, 322 feet; beam, 52 feet 4 inches; displacement, 4,950 tons. Her engines are to develop 5,300 I.H.P., giving a speed of 16 knots, and her normal coal supply of 680 tons will give her a radius of action of 6,000 miles at 10 knots speed. Her armament will consist of two 9·4-inch guns mounted singly in turrets protected by 10-inch hardened steel, one forward and one aft; four 5·9-inch Q.F. guns, mounted in armoured casemates on the upper deck, two abaft the foremost turret, and two before the after turret; four 12-pounder Q.F., and eight 1·4-pounder Q.F. guns, with three torpedo-tubes, two of which will be submerged. Protection is afforded to the hull by an all-round water-line belt of 6-inch hardened steel, tapering at the extremities, and a 2-inch armoured deck.—*Mittheilungen aus dem Gebiete des Seewesens* nach *Marineblad.*

RUSSIA.—*The "Retwisan."*—At the Cramps yard, Philadelphia, where this new first-class battle-ship for the Russian Navy is being built, it is hoped to establish a record in the matter of big ship construction with this vessel. The shortest time for building a modern-type battle-ship is twenty-two months, and this record is held by an English establishment. It is an open secret that the Cramps are straining every effort to beat the English record, because, if successful, it will accord an immense impetus to the building of foreign ships in American yards. The entire hull of the "Retwisan" will be covered amidships with armour-plate. At the water-line the armour will measure 9 inches in thickness, and the water-line will be further reinforced by the protective deck being brought down to the lower edge of the belt-plating. Higher up on the hull will be 6-inch armour, tapering off to 5-inch plates in the vicinity of the central battery guns. Krupp process armour will be employed. The adoption of the all-over hull protection is due principally to the lessons learnt from the battle off Santiago. The Spanish cruisers were supplied with water-line belts. The upper hulls were unprotected, and it was in the upper structures that the damage was wrought. The "Retwisan," in size, approaches closely to the American battle-ship "Iowa." The principal features of the Russian craft are:—Displacement, 12,700 tons; length, 374 feet; beam, 72 feet 2 inches; draught, 25 feet; I.H.P., 16,000; normal coal supply, 1,016 tons; full coal supply, 2,000 tons; speed, 18 knots. The battery will consist of four 12-inch guns in turrets, twelve 6-inch Q.F. guns in a central battery, and, as the auxiliary battery, twenty 3-inch guns; twenty 3-pounder guns and six 1-pounder guns. Torpedoes will not be carried. The heaviest armour provided for in the designs is 10 inches in thickness. This thickness will be found in the turret-plates. There will be 4-inch armour-plates on the protective deck. The complement of the "Retwisan" will be 732 men.

Armour Plate Trial.—A highly successful test of Krupp armour plate was held lately at the naval proving grounds, Indian Head, when a 5-inch plate 8 feet square withstood the impact of 5-inch armour-piercing projectiles, fired at velocities ranging from 2,068 to 2,099 feet per second. No cracks were developed and the greatest penetration was estimated to be not over 2½ inches. The plate was the product of the Carnegie Company and was selected from a lot by the Russian inspector, the armour being manufactured for the ships building by the Cramps for that Government. These are the velocities and results of the five impacts:—First round, Midvale armour-piercing projectile, fired at a velocity of 2,068 feet per second. The estimated penetration was 2 inches, with no cracks. The shell broke up badly, the head remaining imbedded in the armour. Second round, same kind of projectile; velocity, 2,057 feet per second; penetration and results same as first shot. Third round, same kind of projectile; velocity, 2,060 feet; penetration and results same as first round. Fourth round, same kind projectile; velocity, 2,099 feet per second; results same as first round though penetration might have been 2½ inches. Fifth round, Midvale projectile; velocity 2,082 feet per second; results

same as first round. The results of the trials have greatly pleased the American ordnance experts and strengthen Admiral O'Neil's opinion in favour of the Krupp armour over all other.—*Army and Navy Journal.*

The Volunteer Fleet.—The Odessa correspondent of the *Times* lately gave the following details with regard to this fleet:—

"The Russian Volunteer Fleet Committee has ordered the construction, at Dumbarton, on the Clyde, of another cruiser, the "Poltava," which will have a speed of nearly 20 knots, and be larger than any of the cruisers now composing this fine fleet of vessels. In view of the recent discussion in England relative to the advantages possessed by the Belleville, as compared with other types of boilers for fast vessels destined to perform service in time of war, it is worthy of note, as showing Russian official opinion in the matter, that the authorities of the Volunteer Fleet are decidedly on the side of the Belleville system. The first vessel of this fleet fitted with the Belleville boiler was the "Kherson," built in 1896, at Hebburn. The working of the boilers was watched with close interest here in Russia, with the result that the same kind of boilers were again specified for the succeeding cruiser, the "Moskva." And now the "Poltava" will likewise be fitted with boilers of the Belleville type, while for this cruiser the committee at St. Petersburg has, at the suggestion of the builders, adopted a twin set of four-cylinder engines, each set having two low-pressure cylinders. The "Poltava" is to be laid down early in the autumn, and is to be completed about the middle of 1901. The cost of the vessel is estimated to be 3,000,000 roubles. It may be added, since this fleet is supposed to be used only for transport and commercial purposes—although its real character is well known to all the Governments of Europe—that not one of the fast cruisers like the "Saratoff," "St. Petersburg," "Kherson," or the "Moskva" ever exceed a speed of 13 knots under ordinary service conditions when going from Odessa to the Far East. Full speed is to be used only in time of war, and it results in an actual loss not covering their expenses, while the cruisers of the fleet which have a speed of 13 knots only not merely cover their expenses, but bring in a very good surplus, which goes towards covering the loss incurred on the working of the faster vessels."

The *Odesski Listok* publishes the report of the Committee of the Odessa Society of Commerce and Manufactures on the work of the Russian Volunteer Fleet during 1898. The number of vessels which traded to the Far East from Odessa was 30, and of these 20 were Russian and 10 foreign, against 18 Russian and 10 foreign in 1897. According to the entries at the Customs the cargo taken amounted to 2,437,000 poods, about 40,600 tons (not including Government stores), of the value of 23,177,000 roubles, or £2,317,700; there was also a large number of passengers, soldiers with their families, emigrants, and convicts. The ships of the Volunteer Fleet numbered 19, and as the cargo to be sent by them was more than they could carry, the directors chartered three foreign ships to assist them. The 22 vessels carried 1,091 cabin passengers, 14,816 soldiers (including their wives and children), 4,391 emigrants, and 1,534 convicts. The total cargo of the 22 vessels amounted to 4,802,000 poods, about 80,000 tons, but of this 3,187,000 poods, or roughly 50,400 tons, consisted of Government stores. On the return journey the vessels of the Volunteer Fleet brought back 460 cabin passengers and 4,333 persons connected with the Army; the return cargo amounted to 1,748,000 poods, or about 30,000 tons. In addition to this work of the fleet the "Kiev" and "Kherson" took the Russian troops to Crete and the "Vladimir," "Kiev," and "Saratov" were employed in carrying army reserves and recruits between Odessa, Sevastopol, Novo Rossiisk, and Batum. The report of the trade and traffic with the Far East for the current year will show a large increase owing to the occupation and development of Port Arthur and Ta-lien wan.

UNITED STATES.—*The Estimates for 1899-1900.*—The Estimates of appropriations for the Navy for 1899-1900, as compared with the current year, show a decrease of $5,229,020 (£1,078,485) in the pay of the Navy. The Bureau of Navigation shows a net decrease of $250,050 (£50,167), $165,000 (£34,000) of this is for transportation and $225,000 (£46,500) for the coast signal system, from which is to be deducted $125,000 (£25,750) for new items. The Naval Academy has $1,620,000 (£334,000) added for new constructions, making a generous total of $2,120,000 (£437,250). Ordnance asks for over six millions (£1,238,000) less than the appropriation of this year, and Equipment five and a half millions (£1,135,000) less. Yards and Docks want nearly as much owing to the increase for new construction, though there is a decrease in the regular appropriation of $4,065,812·50 (£828,573). The new items include the following appropriations for improvements at the Navy Yards:—Boston, $267,000 (£55,067); Brooklyn, $411,362 (£84,843); League Island, $515,767 (£103,150); Washington, D. C., $170,000 (£35,000); Norfolk, $1,980,000 (£408,440); Port Royal, $145,000 (£29,750); Key West, $112,520 (£23,250); Mare Island, $755,750 (£155,720); Puget Sound, $41,500 (£8,500). The following appropriations of last year are omitted:—Four timber dry docks, about $800,000 (£165,000); coaling wharf, Japonski Island, Alaska, $5,000 (£1,030); housing torpedo-vessels at such station as may be selected, $150,000 (£31,000); steel floating dry dock, Algiers, $200,000 (£41,250); board on dry docks, $1,000 (£206); floating dry docks, Gulf Coast, $250,000 (£51,500); total, $1,406,000 (£289,986). The Bureau of Medicine and Surgery wants $45,000 (£9,300) for Chelsea Naval Hospital, but it shows a net decrease in the amount asked for of $160,600 (£33,000). The Bureau of Supplies and Accounts wants $45,000 (£9,300) more. The Bureau of Construction and Repairs shows a net decrease of $7,421,400 (£1,530,680), and Steam Engineering $5,260,000 (£1,085,000). The Marine Corps will take $578,183 (£119,249) less. The following estimates are made for increase of the Navy:—Construction and machinery, $5,992,402 (£1,236,930), a decrease of $7,656,071 (£1,579,064); armour and armament, $4,000,000 (£825,000), a decrease of $3,162,800 (£632,560); equipment, $200,000 (£41,250), decrease $215,000 (£44,333). The estimates for 1898-9 were $45,538,992·15 (£9,392,416), and the appropriations $113,532,306·95 (£23,416,031). The estimates for 1900 are $47,098,251 (£9,714,014), only about a million and a half increase on the normal estimates for the previous fiscal year, though new items call for $7,027,834·80 (£1,405,566). The emergency fund of last year, $25,000,000 (£5,156,000), disappears altogether, so that there is a saving on the year's appropriations, as compared with 1898-9, of $66,434,055·87 (£13,702,024), nearly a dollar a head for each individual citizen.

Steam Trials.—A report of the builders' trial of the U.S. battle-ship "Alabama" on August 29th, off Delaware Bay, over a distance of 11½ knots, states that in the last of the four runs made over this distance, she reached a rate of speed of 17·2 knots per hour. This speed was obtained under forced draught, 165 lbs. of steam and with 113½ revolutions of the propellers. The wind at the time favoured the vessel, blowing strong from the north-east.

The run immediately preceding the last one was made at the rate of 15·43 knots an hour, weather conditions being reversed. This makes the average speed for the two runs under forced draught 16·23 knots per hour. Her builders, Messrs. Cramp, of Philadelphia, consider the trial very satisfactory, especially as the hull of the vessel under water could not have been in very good condition, not having been cleaned for over a year. The ventilating system in the fire-rooms will, probably, have to be made more effective. After the run the "Alabama" returned to the yards of Messrs. Cramp, at Philadelphia, where she will be made ready for her official trial trip.

The new first-class battle-ship "Kearsarge" has been taken into dock to have her bottom cleaned, in preparation for her official trial trip. At an informal trial

held lately, during half an hour's steaming under forced draught she maintained a speed of 17·2 knots, although her bottom was foul, the ship not having been in dock for nearly a year. The trial was also made in shallow water, the depth varying between 10 and 12 fathoms, or the speed probably would have been even greater. It is now confidently expected that the "Kearsarge" will make 18 knots over the deep-sea trial course.

The Submarine Torpedo-boat "Plunger."—Important changes are about to be made in the submarine boat "Plunger," designed by Mr. John P. Holland, and now being built at the Columbian Ironworks for the Holland Submarine Torpedo-Boat Company. While the boat is practically completed she has never been given a surface nor a submarine trial away from the wharf. With the water in her boilers heated sufficiently to give the "Plunger" her full speed the temperature below her battened decks has been almost unbearable. It is claimed that there is no way of getting sufficient air to the crew on account of their crowded quarters, due to the great quantity of machinery inside the boat. Petroleum is now used to generate steam, and the lack of air makes it impossible to secure enough oxygen to burn the petroleum, and, at the same time, keep the crew alive.

The steam-generating boiler is to be taken out and Diesel oil motors are to substituted. This alteration will make much more room in the interior of the boat. The three screws will be retained, although it was Mr. Holland's intention to have but one screw in the vessel. Additional electric storage cells will be added, to be used in driving the craft when she is under water, the Diesel motors to be used only on the surface. The proposed changes will have to be submitted to the Navy Department before they can be made. The speed of the boat called for is 15 knots on the surface and 8 knots under water.

Armour for New Ships.—The Secretary of the Navy has issued a circular advertisement for bids for armour intended for the battle-ships authorised last summer, the four monitors provided in the same Act, and the battle-ships and armoured cruisers included in the Naval Act of this winter. Armour is now required for six battle-ships, four monitors, and three heavily armoured cruisers. The Navy Department will consider the most advantageous terms presented by any firm capable of manufacturing armour meeting the Government's requirements. It may be recalled that the two leading armour firms declined to bid two years ago when the limit of price had been fixed at $300 (£61 17s. 6d.) a ton, and under the stress of war exigencies Congress advanced the limit of price to $400 (£82 10s.) for the armour of ships then under construction and for those authorised by the Act of July, 1898.

Armour for the battle-ship "Maine," and her sister vessels "Ohio" and "Missouri," and the four monitors for which the price is fixed at $400 (£82 10s.) a ton, will amount to about 10,000 tons, and in addition to this at least 14,000 tons are required for the three battle-ships and the three armoured cruisers authorised last winter, making a total of about 24,000 tons, representing in value nearly $9,000,000 (£185,645). This armour under the advertisement must be delivered within from one to three years, and the fact that the period covered is so great may constitute an inducement, it is thought, to the acceptance of a contract. The ballistic requirements will be those expected to be met by armour manufactured by the Krupp process, and while it is not specified that the armour shall be of this variety, it is not probable that any will be accepted that does not come up to its standard. Never before in the history of the new Navy has the Government issued a call to armour firms for supplying so immense a quantity of plate, and the amount involved equals the cost of all armour supplied to the Navy until within about three years ago. Should none of the present armour firms or other manufacturers be willing to develop their plants so as to render them capable of manufacturing satisfactory plate and submit acceptable bids, the whole question must necessarily go over to Congress for reconsideration.

Trials of New Guns.—A highly satisfactory test of the new 6-inch Q.F. gun constructed for the American Navy by Messrs. Vickers, Sons & Maxim, Ltd., has been lately held at the Indian Head Proving Ground.

The trials were conducted under the direction of Captain A. B. Couden, the official in command of the Indian Head Proving Grounds, in the presence of Rear-Admiral C. O'Neill, Chief of the Bureau of Ordnance, and other officials. This gun had already been fired at the proving ground in England of Messrs. Vickers, Sons & Maxim, Ltd., in the presence of the naval attaché representing the Bureau of Ordnance, but the further trials at the Indian Head were held for the purpose of demonstrating the efficiency of the system to the Chief of the Bureau of Ordnance.

The first shots were fired with cordite, which in each instance gave velocities of 2,700 foot-seconds. After a sufficient number of rounds to demonstrate the fact that the velocities would exceed what was expected of the gun, Admiral O'Neill determined to obtain a comparative result by using Navy smokeless powder. Accordingly, he had employed a charge that would give a chamber pressure not exceeding 17 tons per square inch, and the result obtained under these conditions was a velocity of 2,913 foot-seconds. Such a muzzle energy with the pressure employed has never hitherto been obtained abroad. In England, with the use of cordite, this gun gave a velocity of 2,873 with a pressure of 17 tons. The result of 2,913 is regarded as very extraordinary and as indicating that the American Navy powder is much superior to the English explosive cordite.

The new 6-inch Q.F. gun was ordered from the Maxim Company by the Chief of Ordnance of the Navy, the United States having already secured the right to manufacture the special mechanism in this country. In the trial in England a number of full charges of cordite were fired at a heavy range at Eskmeals, Cumberland, during which a velocity of 2,873 feet per second was obtained for a working pressure of 17 tons. The gun was then subjected to higher strains to test its general construction and mounting, which were made in Sheffield. The projectiles fired weighed 100 lbs., and were fitted with a gas check, which, to a considerable extent, accounts for the high energies obtained, and prevents any abnormal wear due to the use of modern gun-cotton or nitro-glycerine explosives.

The striking energy of the gun was no less than 5,724 foot-tons, which would perforate a thickness of steel armour of 17 inches. The energy obtained per ton of gun is 768·3 foot-tons, and as a rate of fire of ten rounds per minute for long series of rounds has been easily obtained, the gun is capable of doing work to no less extent than 57,240 foot-tons per minute.

The mounting is constructed of light steel forgings, with the special view of reducing the weight on board ship, and yet securing ample strength for withstanding the strains of so high powered a gun. The general construction admits of great ease in training and elevating, which operations can be performed by one man, who also fires the gun from a platform, which rotates with the mounting. The energy of recoil is absorbed by a small hydraulic cylinder, in combination with two springs, which latter, after firing, return the gun to its firing position. These arrangements are placed underneath the gun, so that they are securely protected from shell fire. The gun itself recoils in a steel cylinder, which protects the outside of the gun from damage from small Q.F. artillery. The novel features in the gun are the high energies and great rapidity of fire obtained from a gun in which the charge is not contained in a metallic case.

A new type of 4-inch 50-calibre gun has also lately been tested at the Indian Head Proving Ground, which gave excellent results. With a charge of 17 lbs. of perforated grain Navy smokeless powder, a muzzle velocity of 2,991 foot-seconds was obtained with a muzzle energy of 2,049 foot-tons, and a chamber pressure of 16·95 tons per square inch. With a charge of 16¾ lbs. a muzzle

velocity of 2,927 foot-seconds was obtained with a muzzle energy of 1,972 foot-tons. The gun was designed for 3,000 foot-seconds muzzle velocity within the limits of 17 tons pressure per square inch, and there is no doubt but that, with a powder of the proper grain, the requirements will be easily fulfilled. The weight of the new gun is 2·72 tons, while that of the old type of 4-inch gun is 1·5 tons. The old type gun, with smokeless powder, has a muzzle velocity of 2,200 foot-seconds, and a muzzle energy of 1,105 foot-tons. The muzzle energy of the new gun is, therefore, 78 per cent. greater than that of the old. The old gun has a muzzle energy of 735 foot-tons per ton of gun; the new gun has a muzzle energy of 750 foot-tons per ton of gun. The old gun has 92 foot-tons muzzle energy per inch of shot's circumference, and the new gun has 170 tons muzzle energy for the same circumference. The old gun has a muzzle energy of 33·5 foot-tons per pound of projectile, and the new gun has a muzzle energy of 62 foot-tons.

A new type of mount for the heavy 4-inch gun was also tested, and worked in a thoroughly satisfactory manner during the firing of the 35 rounds to which the gun was subjected.

The new monitors, in addition to their 12-inch turret guns, will each have an auxiliary battery of four of the new 4-inch guns.

The Ordnance Bureau of the Navy is much gratified with the performance of the new gun, as the larger calibre of the new high-powered gun now being manufactured for the battle-ships of the "Maine" class and the monitors are designed practically on the same lines as the 4-inch gun just tested.

New Ships.—There are now eight battle-ships under construction, and three more authorised but not designed; four monitors building, and three armoured cruisers, powerful in speed and protection, and also not designed; a large fleet of destroyers and torpedo-boats, a submarine boat, a cruiser and six unprotected cruisers of 3,100 tons displacement, about to be contracted for. The names of the various craft and the percentage of completion are given in the following tables, which show the percentage of work done on the vessels named, according to a return recently issued:—

Battle-ships—"Kearsarge," 16 knots, 94 per cent.; "Kentucky," 16 knots, 91 per cent.; "Illinois," 16 knots, 68 per cent.; "Alabama," 16 knots, 89 per cent.; "Wisconsin," 16 knots, 76 per cent.; "Maine," 18 knots, 10 per cent.; "Missouri," 18 knots, not started; "Ohio," 18 knots, 4 per cent.

Sheathed cruiser—"Albany," 20 knots, 85 per cent.

Monitors—"Arkansas," 12 knots, not started; "Connecticut," 12 knots, 14 per cent.; "Florida," 12 knots, 12 per cent.; "Wyoming," 12 knots, 20 per cent.

Torpedo-boat destroyers—"Bainbridge," 29 knots, 17 per cent.; "Barry," 29 knots, 17 per cent.; "Chauncey," 29 knots, 17 per cent.; "Dale," 28 knots, 15 per cent.; "Decatur," 28 knots, 15 per cent.; "Hopkins," 29 knots, 22 per cent.; "Hull," 29 knots, 22 per cent.; "Lawrence," 30 knots, 36 per cent.; "Macdonough," 30 knots, 33 per cent.; "Paul Jones," 29 knots, 30 per cent.; "Perry," 29 knots, 30 per cent.; "Preble," 29 knots, 30 per cent; "Stewart," 29 knots, 4 per cent.; "Truxton," 30 knots, 4 per cent.; "Whipple," 30 knots, 4 per cent.; "Worden," 30 knots, 4 per cent.

Torpedo-boats—"Dahlgreen," 30 knots, 98 per cent.; "T. A. M. Craven," 30 knots, 96 per cent.; "Stringham," 30 knots, 80 per cent.; "Goldsborough," 30 knots, 78 per cent.; "Bailey," 30 knots, 57 per cent.; "Bagley," 28 knots, not started; "Barney," 28 knots, not started; "Biddle," 28 knots, not started; "Blakeley," 26 knots, 45 per cent.; "De Long," 26 knots, 44 per cent.; "Nicholson," 26 knots, 38 per cent.; "O'Brien," 26 knots, 38 per cent.; "Shubrick," 26 knots, 47 per cent. "Stockton," 26 knots, 40 per cent.; "Thornton," 26 knots, 39 per cent; "Tingey," 26 knots, 28 per cent.; "Wilkes," 26·5 knots, 16 per cent.

Submarine torpedo-boat—"Plunger," 8 knots, 85 per cent.

The new monitors which are being constructed in place of the single turret ships originally designed and contracted for, are to be vessels of 4,000 tons displacement, mounting two turrets carrying four 10-inch and an effective battery of rapid-fire guns, with a greatly increased steaming radius, and in all respects modern vessels of their type. They will be at least 1,000 tons larger than the type first contemplated, and more nearly approach in fighting efficiency the "Terror" class. The vessels as designed originally were to be of about 2,900 tons displacement, 200 tons coal capacity, a speed of 12 knots, and mounting two 12-inch guns in a single turret forward. The modified plans will provide vessels having displacements of at least 4,000 tons, a bunker capacity of 400 tons, and a range of action exceeding 4,000 knots at a 12-knot speed, which about equals that of the battle-ship "Iowa." Two turrets with twin 10-inch guns replace the 12-inch turret. The original speed of 12 knots is retained, compelling engines and boilers of 3,200-H.P. instead of 2,200-H.P. The hull has been materially lengthened, and the draught increased from 12 feet 6 inches to 14 feet 6 inches. In the new designs the protected deck is 2½ inches thick instead of 1½ inches, and the interior bracing of the vessels is made slightly heavier and stronger. The limit of cost of the monitors fixed by Congress is $1,250,000 (£257,800), and the officials are confident that the improvements can easily be had within that limit. The estimated cost for the armour was $130,000 (£26,800), but the ordnance officials calculate that item will be increased to $187,000 (£37,400) for the larger vessels, and this fact, together with the other added weights which were essential to the improved monitors, may necessitate a request to Congress to remove the armour from the limit of cost, which was not done in the appropriation for the ships. As now designed, the new monitors should be most effective war-vessels, and probably double the fighting efficiency of those designed and contracted for.

New Dry Dock.—The new naval dry dock soon to be built by the Government at Boston, U.S.A., will have the following dimensions :—Length, 750 feet ; width on floor, 80 feet ; width at top, 114 feet ; width at entrance, 95 feet ; depth to floor, 40 feet ; depth on sill, 30 feet. It will be built of granite or concrete faced with granite. The steel caisson gate will be about 95 feet long, 36 feet deep, and 24 feet beam. The pumping plant will include three 45-inch centrifugal pumps. If built entirely of granite, about 576,000 cubic feet of cut stone and 1,390,000 cubic feet of rubble masonry will be required ; if concrete faced with granite, the quantities would be about 256,000 cubic feet cut granite and 1,710,000 cubic feet of concrete.—*Scientific American* and *Army and Navy Journal.*

MILITARY NOTES.

PRINCIPAL APPOINTMENTS AND PROMOTIONS DURING SEPTEMBER, 1899.

Major-General the Hon. N. G. Lyttelton, C.B., to be Major-General on the Staff to command an Infantry Brigade at Aldershot. Colonel A. S. Wynne, C.B., to be Assistant Military Secretary at Head Quarters. Brevet Colonel A. R. F. Dorward, D.S.O., to be a Colonel on the Staff for Royal Engineers, to command the troops at Wei-hai-Wei, and to have the substantive rank of Colonel in the Army. Colonel (temporary Major-General) W. R. Truman, Inspector-General of Remounts, to be Major-General. The following Lieut.-Colonels to be Colonels:—W. J. Orr, I.S.C.; B. L. P. Reilly, I.S.C.; R. A. Wahab, C.I.E., R.E.; W. J. Irwin, h.p.; H. C. C. Lucas, I.S.C.; F. O. B. Foote, Royal Garrison Artillery; G. G. Grimwood, King's Royal Rifle Corps. Lieut.-General Sir George S. White, G.C.B., G.C.S.I., G.C.I.E., V.C., to be a Lieut.-General on the Staff to command the troops in Natal. Lieut.-General Sir Charles Mansfield Clarke, Bart., K.C.B., to be Quarter-Master-General to the Forces. Colonel I. S. M. Hamilton, C.B., D.S.O., to be an Assistant Adjutant-General in Natal. Major and Brevet Lieut.-Colonel Sir H. S. Rawlinson, Bart., Coldstream Guards, to be a Deputy Assistant Adjutant-General in Natal. Major-General Sir H. C. Chermside, G.C.M.G., C.B., R.E., to be a Major-General on the Staff to command the troops in the Curragh Brigade. Major-General Sir W. F. Butler, K.C.B., to be a Lieut.-General on the Staff to command the troops in the Western District, and to have the temporary rank of Lieut.-General whilst so employed. Colonel (temporary Major-General) J. D. P. French, now commanding the Cavalry Brigade at Aldershot, to be a Major-General on the Staff to command the Cavalry in Natal, and to have the local rank of Major-General whilst so employed. Brevet Colonel C. M. H. Downing to be a Colonel on the Staff to command the Royal Artillery in Natal, and to have the substantive rank of Colonel in the Army. The undermentioned officers to be Assistant-Adjutant-Generals in Natal:—Colonel C. E. Beckett, C.B., and Major and Brevet Lieut.-Colonel H. M. Lawson, R.E. Lieut.-Colonel and Brevet Colonel E. W. D. Ward, C.B., A.S.C., to be Assistant-Adjutant-General in Natal. Major-General H. M. Evans, C.B., I.S.C., to be Lieut.-General. Colonel J. L. Fagan, I.S.C., to be Major-General.

HOME.—Lord Roberts has issued his comments on the recent manœuvres in Ireland. He desires to draw the attention of all ranks to the following tactical lessons which have been learned or emphasised during the recent manœuvres:—

Cavalry.—Although from the close nature of the country there were no opportunities for the employment of cavalry upon the actual battle-field in shock tactics, still there have been plenty of lessons to be learnt in reconnaissance and detached duties. First, the director would point out the value of a very high standard of all-round professional training among cavalry officers, which the manœuvres must have brought home to many. The information sent in to a commander by his officers' patrols often influences, as was seen, the whole of his dispositions. Patrol leaders must therefore, in order to bear the responsibility thus thrown upon them, have not only a good tactical knowledge of the working of other arms, but also a sound strategical perception to enable them to grasp and rightly appreciate various military situations, and to report clearly and intelligently what they have observed. Had the Red patrol leaders possessed such a strategical grasp of the situation on August 11th, their commander could not have received the conflicting and inaccurate reports which reached him, nor would the patrols have been so easily deceived by the movement of a few outposts as to the true direction of the enemy's columns. There have been many opportunities for the action of

cavalry dismounted in the defence of bridges and other important points. The possession of a firearm gives cavalry great independence, and where every road is a defile great tenacity and power of resistance. Good shooting is not the least important qualification of the cavalry soldier. The necessity for keeping the led horses under cover was not always appreciated. When movement off the roads is practically impossible, the concentration of masses of cavalry upon a front of one section becomes absurd, and the long columns are a positive incubus. In such country there is no part of the work of cavalry which could not be as well and far more expeditiously performed by an equal number of cyclists.

Artillery.—Artillery are hampered perhaps more than other arms by the difficulties of close country, but their tactics must be adapted to such conditions. The fundamental principles of massing guns and acting in combination with and in close support of the other arms hold good. The country was as a rule unsuitable for combined cavalry and horse artillery movements. The best value, therefore, could be obtained from the guns by massing the horse artillery and field batteries. The Blue artillery who followed this principle were invariably in superior force to the Red at the decisive point. The temptation to detach batteries to momentarily important points must be resisted, and nothing must be permitted to interfere with the concentration of the fire of every available gun at the decisive point. The difficulty of finding suitable positions for a line of guns in an enclosed country accentuates the necessity for brigade division commanders, and in case of isolated batteries for battery commanders, riding forward at a rapid pace to reconnoitre when a change of position has been decided on. The neglect of this procedure was noticeable on several occasions and caused considerable delay in taking up the new position. Such delay might possibly entail the failure of an attack from want of artillery support at the proper moment. Good effect can seldom be expected from artillery fire at ranges over 4,000 yards, such fire is apt to be dangerous to its own infantry if they are at close quarters with the opposing force, not only on account of the difficulty of distinguishing friends from foes, but because the limit of the time fuse has been reached.

Infantry.—The close country emphasised more than ever the importance of developing the independence and individual initiative of company and even section commanders, for the control of the battalion commander ceases once his companies leave the road. Habits of independence cannot be acquired suddenly, but must be the result of systematic training and decentralisation in quarters as well as in the field. More than one instance occurred where reconnaissance of his own immediate vicinity was neglected by a battalion commander. It is the duty of every commander to search constantly and carefully the area affected by his command, in order not only to guard himself against that deadliest of all foes, surprise, but enable him to seize any opportunity which may present itself. To give two illustrations—first, had the left flank battalion of the Red attack on the Durrow-hill thoroughly reconnoitred its exposed flank, the counter-stroke would have been detected; secondly, on August 15th a Red battalion stood on the Durrow-Ballyragget road within 500 yards of Ballyconra Ford in ignorance that the Blue army was actually crossing there. Combined tactics and the marching tactics generally were good, and the field artillery, though subsequently batteries were detached, always started together well up near the head of the column, while in no instance was a single battery assigned to the advance guard. The forming up for action of a marching column in close country is especially difficult and requires far more time and method than were always bestowed upon it. Great stress should be laid upon the personal reconnaissance by the commander of a force, and it is doubtful whether he would not, in company with the C.R.A. be better placed in the presence of the enemy with the main body of the advance guard, rather than in the position assigned to him by our Drill-Book, at the head of the main body. In the former he is in a better position to receive information. He can control the action of the advanced guard commander, and he is on the spot to make his dispositions for action and direct the units of the main body straight to the

places assigned to them. Under cover of the advanced guard the commander should make his reconnaissance and decide upon his dispositions. The artillery should arrive and come into action simultaneously, while the infantry should be led into the positions assigned to them and there form up, the whole being well in hand before the companies are extended. It is essential that the plan of action should be explained to and understood by every officer concerned, for without such understanding co-operation is impossible. The above procedure may be slow, but it is sure, and it must be remembered that once an attack takes a wrong direction it cannot be changed. The counter-stroke is the essence of defence, and the director was glad to see that defensive dispositions invariably included such preparation. With a clear field of fire modern artillery can take care of its own front, and by occupying a large part of a position leave more troops in hand for offence. In fact, with flanks protected and prolonged by infantry intrenched, the guns form a pivot of manœuvres for the delivery of the counter-stroke. The preparation of positions for occupation in close country requires much time and many tools for the destruction of parallel hedges to clear the field of fire. The existence of banks and hedges gives apparently equal advantages to attack and defence, for, although they a tend to destroy cohesion of attack, they provide parallels to be occupied in succession during the advance. Perhaps the most striking lesson learned during these operations has been the extreme difficulty of inter-communication. Not only was extraordinary difficulty found in transmitting, receiving, and circulating information, but also in the issue of orders to detachments. This can perhaps be best remedied in country such as that in which the operations were carried on by having a highly-trained corps of cyclists, messengers, and signallers, and by placing at all neighbouring cross-roads selected non-commissioned officers, to whom, as far as possible, the position of the [various] bodies is known. A knowledge of ground and facility in map-reading are essential in messengers for the successful delivery of orders and messages. The importance of road junctions and the villages which often command them can hardly be over-estimated in such country as that in which we have been operating.

TRANSVAAL.—An officer, writing under date May 27th, 1899, gives the following narrative of a visit to the Transvaal, which cannot fail to be of interest at the present time:—In the spring of 1898, on my return from Rhodesia, I stopped ten days in Johannesburg, spending two of these in Pretoria. While in Pretoria I was shown over the Transvaal artillery barracks. The armament consisted of three complete six-gun batteries, the guns being field Krupp, about the same calibre and power as our 15-pounders. They are said to be quick-firers, but I consider it doubtful whether they are really constructed on a Q.F. system. The guns, stores, and ammunition were all obtained from Germany. In addition to the three field batteries, there were several 7-pounder (of 200 lbs.) guns and about twenty Maxims, about twelve of which were mounted on field carriages. The field artillery equipment includes a field telegraph. The field guns are horsed by teams of six cobs, about 14·2 to 14·3 hands. The cobs looked very well cared for and groomed, but I doubt if they would prove, in actual service, strong or heavy enough for the guns.

A modern earth fort, built since the Jameson raid, commands the railway and approaches from Johannesburg. A similar earth fort also commands Johannesburg. These were most strictly guarded and it was impossible to get at all near. I was told they were armed with heavy modern guns. The Boers, 20,000 or 30,000 of whom are said to be capable of bearing arms, can take the field at very short notice, and are all provided with arms and ammunition by the Government. Every Boer has a pony, and by warning the "field cornets" of districts by wire, who warn the Boers on the near farms, the tenants of the latter in turn send off to the next farm, and so a large number of men can be got together at the shortest notice. The Boer carries his rifle, ammunition, and about six days' food on his

pony. I was very much struck with the way the guns, harness, horses, etc., were kept, and the Government is, apparently, very lavish with its money, in order to have everything of the best and most serviceable nature.

Great capital has been made by peace-lovers in England over the inferiority n artillery in South Africa, as compared with the Boers new armament. The Boers have forty-six Q.F. guns, and six 2·5-inch mountain guns, and the inevitable comparison is made between the obsolete 15-pounder guns, which are not Q.F., and the Boers' Q.F. guns. The difference in value between a Q.F. and a non-Q.F. gun is not very striking, while the gunners who serve the former weapon must be trebly efficient. Then a number of the Boer guns are heavy weapons, mounted in their forts round Pretoria. Again, the one thing fatal to Boer tactics will be the necessity of protecting and covering the withdrawal of field artillery, the greatest impediment a guerilla force can have.—*U.S. Army and Navy Journal.*

AUSTRIA-HUNGARY.—The increase of the Landwehr, commenced in 1898, continues during 1899 in such a way as to arrive gradually at the fixed number of 8 divisions, composed of 16 brigades and 115 infantry battalions.

Before this re-organisation the Landwehr numbered 23 Landwehr infantry regiments, with from 3 to 4 active battalions, 1 reserve, and 1 depôt battalion cadre, and 3 Territorial regiments, with from 3 to 4 depôt active battalions, and 1 depôt battalion cadre. The Landwehr infantry consisted of 82 and the Territorial of 10 battalions. The development of the 23 reserve battalion cadres into active battalions, the redistribution of the infantry battalions, thus increased from 92 to 115, into regiments of 3 battalions, and the re-organisation of the Landsturm districts, are the principal results aimed at. The following table gives the particulars of the details of the new organisation.

Landwehr Commands.	*Numbers of				Alterations carried out.		According to the re-organisation.		Numbers of the Landwehr Infantry Regiments.	
	Regiments.	Active Battalions.	Reserve Battalion Cadres.	Active Battalions formed with Res. Batt. Cadres.	Increase.	Decrease.	Active Battalions.	Regiments.	Old.	New.
Cracow	3	11	3	14	1	—	15	5	13th, 15th, 16th	31st, 32nd
Vienna	3	9	3	12	3	—	15	5	1st, 14th, 21st	24th, 25th
Graz	3	11	3	14	1	—	15	5	3rd, 4th, 5th	26th, 27th
Prague	3	11	3	14	1	—	15	5	6th, 7th, 8th	28th, 29th
Josefstadt ...	4	13	4	17	—	2	15	5	9th, 10th, 11th, 12th	30th
Przemysl ...	2	8	2	10	2	—	12	4	17th, 18th	33rd, 34th
Lemberg ...	3	12	3	15	—	—	15	5	19th, 20th, 22nd	35th, 36th
Tyrol	3	10	—	10	1	5	6	2	I., II., III.	III. done away with
Upper Austria and Salzburg	1	3	1	4	—	1	3	1	2nd	—
Zara	1	4	1	5	—	1	4	1	23rd	—
Total ...	26	92	23	115	9	9	115	38	26	13 – 1 = 12
		115			0					

*According to the situation at the end of 1897.—*Die Vedette.*

Combined manœuvres of the Danube flotilla, composed of the monitors "Körös," "Maros," "Leitha," and "Szamos," and the land forces, took place on the 29th August last in the neighbourhood of Rossatz.

The objective of the Northern force, which was composed of the three arms, was to force the bridge over the Danube at Stein. The Danube flotilla had to defend this bridge whilst the land forces belonging to its side took up a defensive position to the north of the Danube. With this object in view the flotilla was divided into two groups of two monitors each, and kept steaming slowly above and below the bridge. The "Körös" opened fire on a detachment of the enemy which, having taken up a position close to the bank, returned the fire with a battery of artillery. Sheltered by sand-bags, the sailors exchanged a hot fire with the infantry. The machine guns, with which the monitors were armed, took part in the fight as well. The firing lasted from 6.30 a.m. to 9 a.m., and during this time the navigation of the Danube was closed to boats other than those taking part in the manœuvres. The Northern force succeeded in silencing the monitors' fire with its artillery, and in crossing the bridge, and the manœuvres terminated in the neighbourhood of Göttweih. The *Illustrierte Militär Post*, from which these details are taken, observes with justice that these manœuvres gave rise to several improbabilities, among which he notices the following, viz., the Northern detachment, instead of occupying the heights, merely lined the river in the presence of the enemy's monitors; and also that the battery of this same detachment took up a position only 100 yards away from the flotilla.

Remarkable results were achieved by some of the regiments taking part in the manœuvres of the Austrian IIIrd and XIVth Army Corps. The 59th Infantry Regiment, with a battalion of the 14th, two Landwehr Regiments, and the 10th Chasseur Battalion marched over the heights of Turach, 1,760 metres high, during a heavy snowstorm, the weather being so intensely cold that the Turach Lake was entirely frozen over. After bivouacking for the night, the troops descended by mountain paths to the Stemperalm, 1,350 metres high, the cold being so great that the men had icicles hanging from their hair. One column of this force marched to the Haidner Alps, 1,800 metres high, and another to the Haidner Höhe, 2,000 metres high. One company was sent to the Datterstel, 2,450 metres high. All these manœuvres were performed without winter equipment, over rocky ground and in deep snow. A heavy snowstorm continued throughout the entire march and not a single man fell out.

The Alpine corps of several Continental countries, especially those of France and Italy, have been brought to a high state of efficiency in recent years, and their organisation and training have received great attention. The Austrian Army has kept pace with this movement, and is in possession of a strong force of mountain artillery attached to each army corps in garrison in Alpine districts. The guns are carried on mules, eighteen being required for each battery. The officers and non-commissioned officers are all mounted, but are, of course, constantly obliged to leave their horses behind in the more difficult parts of the mountainous regions. To each of the Austrian mountain batteries a signalling corps is attached. The signalling is done with square flags of different colours turned in the socket of an iron tripod. By means of the number of turns and the length of the pauses between them, communications are made with great rapidity to other signal stations and are visible for miles around. In Italy and France, as well as Austria, mountain artillery and signalling are among the most important of the developments of the frontier defences.

FRANCE.—The French military forces in the Soudan are as follows :—

18 companies of Soudanese tirailleurs.
7 companies of foot frontier guards.
1 squadron and 1 troop of mounted frontier guards.
1 squadron of Soudanese spahis.
1 dromedary troop.
4 sections of artillery.
1 detachment of European artillery artificers.
1 company of guides.

These make, altogether, a total effective of 600 Europeans and 4,200 natives. These forces are distributed amongst seven different districts, each one having its own special effectives, and a fixed *rôle* suitable to the country to be occupied. The following are the names of the districts with their special effectives :—

1. The Western District, whose chief place is Kayes, is garrisoned by two companies of tirailleurs, who act as a reserve, and are the only force stationed in the so-called basin of Senegal, from Kayes to Bammako.

2. The Niger District, whose chief place is Bammako, is garrisoned by two companies of tirailleurs, a troop of spahis, and three mobile sections of artillery. These forces, employed in the difficult task of provisioning, constitute a sort of general reserve, and are, in case of necessity, at the disposal of the lieut.-governor, who may not, however, remove a garrison from any post. This reserve is necessary, for it must be remembered that since 1896 the French Soudan has more than doubled in extent, that it possesses frontiers which may be considerably developed, and that it is indispensable to be prepared to rapidly face any threatening eventualities at Timbuctoo, at Say, at Kong or on the frontiers of the Liberian Republic.

3. The Southern District, chief place Siguiri, is garrisoned by a company of tirailleurs and two companies of frontier guards. The tirailleur company are quartered at Kouroussa, in proximity to the Liberian frontier and to the English colony at Sierra Leone. The utility of this company is indisputable, having regard to the events at present occurring in Liberian territory, and which deserve special attention. With regard to the two frontier guard companies, they are not too much to support the neighbouring inhabitants of Mackhona and of the Thoma country, and to keep in check the cannibal population inhabiting the vast forests of the extreme Liberian hinterland.

4. The Northern District, of which the chief places are Dory and Say, is garrisoned by four companies of tirailleurs, a dromedary troop, and a mobile section of artillery. This district, which is geographically bounded by the Sahara, and inhabited by dangerous nomads, is obliged to be strongly occupied. In addition, in consequence of the extension towards the East, the course of the Niger, at once a boundary and a line for supplies, has had to be occupied.

5. The North-Eastern District, chief place Bandiagara, is garrisoned by three companies of tirailleurs, a company of frontier guards, a troop of spahis, and a troop of mounted frontier guards.

6. The Volta-Kong District, whose chief place is Bobo-Diolasso, is garrisoned by six companies of tirailleurs, two troops of spahis, one mobile artillery section, and two companies of frontier guards. These troops are not any too many in a district inhabited by a warlike population accustomed to pillaging one another, on whom the prestige of the French arms has not yet been impressed, and who consequently defy authority. There remains much to be done before the Volta-Kong District is thoroughly subdued.

7. The Sahel District, chief place Goumhou, is garrisoned by two companies of foot and one troop of mounted frontier guards. The state of this district is, at the present time, most re-assuring. The revolts which took place there and caused such disquietude at the time of Colonel Audéoud's march on Sikasso, have quite

disappeared. On the other hand, the Moors inhabiting the right boundary of Senegal, have come and given in their submission. Nevertheless, it is very necessary to keep a military force in this district capable of keeping the turbulent spirits in dread of prompt suppression.

In addition, reserves have been formed in the Soudon, who one day or other may be raised, equipped, armed, and ready to enter on a campaign. These reserves are formed from former tirailleurs and spahis, or from natives who are known to be good horsemen or good shots. They provide a contingent of about 10,000 men.—*Le Progrès Militaire.*

GERMANY.—The following notes have been kindly supplied to the JOURNAL by an officer who was present at the German Imperial Manœuvres:—

The German Kaiser manœuvres took place this year in South Germany, beginning in the Black Forest and ending in Wurtemberg. Three army corps were engaged, namely, the XIIIth (Wurtembergers), headquarters Stuttgart; the XIVth (Badeners), headquarters Karlsruhe; and the XVth (Alsace), headquarters Strasburg. The XIIIth and XIVth Corps, with a cavalry division, formed the defending or Blue army. It included 49 battalions, 45 squadrons, and 38 batteries. The invading Red force was represented by the Strasburg Corps and a cavalry division. The XVth Corps is exceptionally strong, and besides leaving troops in garrison in Alsace it was able to send four infantry divisions into the Black Forest for the manœuvres, two of them of full strength, the other two with only 8 and 10 battalions, instead of the regulation 12. The whole Red force included 42 battalions, 45 squadrons, and 30 batteries. In all, there were on both sides about 75,000 men and 408 guns in the field. The Blue army was commanded by General von Bülow, the Red by General von Meerscheidt-Hüllessen.

Instead of having the usual review of the united forces at the close of the operations, the Kaiser reviewed each corps separately at its headquarters, the XVth at Strasburg on September 4th, the XIIIth at Stuttgart on the 7th, and the XIVth at Karlsruhe on the 8th. Before these last dates the XVth had crossed the Rhine, and was ready for its advance through the Black Forest. The first contact between the two armies was on the 9th.

The general idea supposed that Alsace belonged to a hostile Power, with the same frontiers as France had in 1870. A Blue army is mobilising and concentrating on the middle Rhine and in the Bavarian Palatinate. The mobilisation of the XIIth Corps at Stuttgart and the XIVth at Karlsruhe is still incomplete, when a Red army of four divisions is pushed across the Rhine near Strasburg to attack the South German forces, divide the two corps from each other and beat them in detail, and cut the important railway line from Stuttgart by Pforzheim to Germersheim, the chief route for the concentration of the southern corps on the Rhine.

Detailed accounts of the operations will be found in the special correspondence of the *Times* (September 22nd, 27th), the *Standard* (September 20th, 22nd), and the *Daily Chronicle* (September 19th, 28th). Here it need only be noted that on the evening of September 8th the Red army had reached the eastern slopes of the Black Forest range. Three of its divisions were concentrated to the south of Pforzheim along the left bank of the little river Nagold from Liebenzell to Calw to Neu Bulach. Two brigades of the cavalry division were pushed out in front of the right towards Stuttgart. An infantry division (the 39th) was thrown back behind the left flank, to guard against an advance of the XIVth Corps from Karlsruhe, and it had a cavalry brigade pushed out to the northwards. Thus, even if the XIVth Corps was ready to march against his left, the Red commander could meet it with two divisions, while still facing east against the XIIIth, with two more divisions and the greater part of the cavalry division.

On this evening the XIIIth Corps was concentrated between Stuttgart and Leonberg, with an outpost line running from Boblingen and Heimsheim, the

cavalry division on the right facing the Red left. The XIVth Corps, which should have been threatening Red's left, was very backward. One of its divisions was still at Karlsruhe, the other had pushed on to Bruchsal, but was still not in striking distance. Next day (the 9th) Red brought his flank guard (the 39th Division) up to Pforzheim, while with his three other divisions he debouched from the forest into the more open country about Weil der Stadt. There was an advanced guard action with the XIIIth Corps, which was moving out from its position about Stuttgart, under von Bülow. The weather had been fine till the 8th, but that day it broke and there were heavy rains, making the roads very difficult.

At the conference after the fight, on Saturday morning, the Blue commander announced that finding himself outnumbered (two divisions against three, and possibly four), and liable to be crushed by the invaders before the Badeners could come to his assistance, he proposed to withdraw by a night march to a position north of Stuttgart, behind the River Glems, right near Mark Groningen, left near Leonberg, the Karlsruhe Corps moving to his aid by road and rail along the northern lines that were still open. To spare the men, these movements were carried out by daylight during Monday, the 11th. Red had clearly won. He had divided the two corps and could strike at the Stuttgart-Germersheim Railway. But in order that the manœuvre campaign might not prematurely collapse, the Blue concentration behind the Glems was allowed, the Red moved up his four divisions to the high ground between Vaihingen and Heimsheim to the west of the Glems Valley. The two armies were thus in position for a general engagement on the 12th.

On that day the Kaiser, who till now had acted as chief umpire, took command of the Blue army. Instead of waiting to be attacked behind the Glems, he crossed the river in the early morning, and met the Red advance with a vigorous counter-attack, two divisions holding the invader in front, while two others turned his right. After this action a new *ordre de bataille* was arranged, with a view to another battle on the Glems position next day. The two cavalry divisions were united in a cavalry corps (Blue) under the Kaiser's command. The King of Wurtemberg took command of a Blue army of three corps (the XIIth, XIVth, and the two stronger divisions of the XVth). The two remaining divisions of the XVth formed a skeleton Red army, which occupied and entrenched a position on the east bank of the Glems, between Stuttgart and Ludwigsburg.

The manœuvres ended with the battle that followed on the 13th. The XIIth Corps on the Blue right made a demonstration against the Red front, while the two other corps swung round across the Glems and fell on the right flank of the defence. Red threw back his right and hurried up every man that could be spared from his left and centre to strengthen it, but he was driven in, and as the defence gave way the retiring troops were charged by the cavalry corps, 54 squadrons led by the Kaiser, who after a long flank march had got on the right rear of the enemy. There was something of the "combined display" about the day's operations, which were witnessed by crowds of spectators from Stuttgart and all the country round.

All who saw the brief campaign were struck by the splendid marching of the men, in bad weather and over muddy roads in hilly country, carrying their heavy campaigning equipment. The staff was not hampered by considerations that bring so much unreality into our own manœuvres. There were no standing camps or prepared encampments. The men were either billeted in towns, villages, and arms, or slept under the shelter of small *tentes d'abri* in the woods and fields. No special arrangements were made for water supply. The nearest well, river, or stream was used. Numerous supply depôts had been established by the departmental corps, with field bakeries and stores under canvas. From these both sides drew their supplies. The long lines of wagon laden with beer barrels that are a feature of our manœuvre supply trains were conspicuous by their absence. Several motor cars of various patterns were used experimentally

for transport purposes. The result was said to be a great success, the motors working day and night, often on steep grades, and with few breakdowns and no serious accidents.

In action the artillery on both sides was nearly always protected by epaulments or gun-pits. Most of the batteries had the new quick-firer served by three gunners, the ammunition being brought up in basketsful from the wagons. The guns used a special manœuvre powder, which is not absolutely smokeless, but produces a thin bluish smoke. The object of using this special powder is, I believe, to minimise the erosion of the guns.

During the last day's battle one of the batteries of the defence remained in action to the last moment to cover the retirement of its infantry, "sacrificing itself" to use the Drill-Book expression, and allowing its guns, at least, to be captured.

The infantry of the defence invariably entrenched themselves, not merely bringing out screens to mark the positions of the trenches, but actually digging them. Sometimes it was a shallow half-hour trench, but I saw several lines of entrenchment in heavy wet soil that must have meant more than an hour's hard work.

There was practically no volley firing. There was a good deal of unreality about the firing line, for no casualties fell out, and nevertheless supports were brought up into the line, with the result that in the later stages of the attack it was two or three deep, only the men in front firing. A German officer with whom I discussed this point said that losses were supposed to have occurred, and the line was considered to be only a single rank, the rest of the men packed into it being those who in real fighting would have been *hors de combat.* In fact, the manœuvre firing line brings its "casualties" along with it. But they take part in the assault, though there is not room for them to fire in the advance. Another unreality results from the practice of many of the mounted officers riding close to the firing line. The captains of companies dismount, but majors and colonels remain in the saddle, often beside the dismounted captains.

There is a decided tendency to close up the successive lines of the attack into something like a great loose column, during the latter part of the advance. In the action of the 12th, the assault of one of the infantry divisions was made by a dense mass of men, the front line of which was at least ten or twelve deep, and they advanced in this way up an exposed slope. To the spectators it seemed that such an attack would have entailed enormous loss.

The cavalry were not conspicuous in any of the battles, except the last. When the great charge was made by the Kaiser the enemy was already retiring pursued by the quick-fire of the rifles and artillery of the successful attacking force. The horses during the charge seemed to be tired, perhaps the result of being pressed too much during the flank march.

Balloons were used on both sides for reconnoitring, the balloon being the sausage-shaped "Drachen-Ballon," which is flown like a kite on a wire unrolled from the drum of the balloon wagon. It presents in proportion to its bulk a smaller surface to the wind than the ordinary shaped balloon and is much steadier when it is being hauled along by the wagon. A smaller balloon of the same kind is used for signalling. During the manœuvre battles it flew from the chief umpire's position. Signals are made by attaching to it inflated globes and cylinders. A single globe hanging from the balloon is the signal for the "cease fire." As soon as it is displayed the battle comes to an end, and the officers who have a right to attend the conference have not to ask where it is to be held. They have only to ride to the point where they see the balloon flying.

The field telegraph, with a telephone apparatus carried by a mounted man was used on at least one of the days to keep the chief umpire in touch with distant points on the field. Messages are still sent as a rule by the corps of mounted messengers, the "Melde-Reiter," and other mounted orderlies. But a good deal

of this work is now being done by cyclists, and some experiments were made this year with flag signalling, two yellow flags being used, apparently on a semaphore system.

I am told that the German Staff has at last got over its long-standing prejudice against machine guns in the field. Maxims have been issued to many of the Jäger battalions, and every Jäger battalion is to have one.—A.

It is on the 1st October of this year that the most important changes, mentioned in the February JOURNAL, are to be introduced into the German field artillery. These changes do not only concern the increase in the number of batteries, but also their distribution amongst the great units, the suppression of corps artillery, and the adoption of howitzers or heavy field pieces.

Up to the present there are in each German artillery corps a brigade of artillery consisting of two regiments, which on mobilisation, become doubled and form :—Firstly, two regiments of divisional artillery of 6 batteries each ; and, secondly, a regiment of corps artillery of 8 batteries each, two of which are horse artillery batteries.

In consequence of the reform of the 1st October, each infantry division will include a brigade of artillery, subordinate to it in peace-time, and bearing the same number as the division. This brigade will consist of 2 regiments of 6 batteries each. The corps artillery is done away with.

By means of this re-organisation the number of the field artillery regiments will be doubled and brought up to 92.

From the same date (1st October) their armament will consist of the Q.F. gun called C/96. One of the four regiments of each army corps will have one group armed with the C/96, and another with the field howitzer, Model 1898, which has a calibre of 12 centimetres and can fire at a very high angle.

As a consequence of this reform the German Army will be able to dispose of 463 field, 20 horse, and 69 howitzer batteries; that is to say, 552 batteries, attached in peace-time to infantry divisions, plus 22 horse artillery batteries belonging to the latter in peace-time, but attached on mobilisation to independent cavalry divisions. This gives a total of 574 batteries.—*Le Temps.*

The German field artillery have been given a new drill and firing regulation, which has been put into force from the 1st October of this year, and about which the German papers give the following details :—

The field howitzer C/98 can be fired with either a curved or flat trajectory. Its efficiency is greatly superior to that of the field gun. The regulation advises that howitzers should not be brought into action at less than 2,100 metres from the objective if it is wished to obtain the greatest penetrative power of the projectiles. Batteries of C/96 guns may be used against all objectives, with the exception of bomb-proof shelters.

As regards howitzer batteries, they are employed with greater efficacy against bomb-proof shelters, against an enemy under cover, against inhabited places, in fact generally against all objectives. As howitzer batteries are especially meant to act against the particular objectives mentioned above, they should not be used as ordinary batteries at the commencement of an action, except when the inability to utilise them as regular howitzer batteries in the course of an action, may be foreseen. But such a case will be exceedingly rare, so that howitzer batteries will always form a sort of reserve at the commencement of an action, whose ulterior employment will remain at the disposal of the commander-in-chief ; this reserve will nevertheless, not form an independent force, like the old Corps Artillery. On the contrary, the batteries will remain with the units to which they are habitually attached. The regulation, too, attaches very great importance to the fact that batteries must remain in position to the last extremity, and orders that a battery that has exhausted its ammunition should not fall back but must remain on the spot until it has been re-stored. Batteries when able to

fire should also not be withdrawn—they should be reinforced by other batteries Even if the losses are very severe, batteries should never abandon their position.—*Revue du Circle Militaire.*

The new field howitzer, Model C/98, has a calibre of 10·5-centimetre and a length of 12 calibres. The breech action is a side-wedge prismatic one, provided with only one handle, on the so-called *Leitwelt* system. It is easier to manage than the new Q.F. gun, only requiring a single movement to open and close the breech. As the charge is variable the metal cartridge has been obliged to be abandoned, and a short metal case substituted, at the bottom of which is the detonator, and which is provided with a flange for extraction. The gun-carriage s similar to that of the field gun C/96, and is furnished with axle-tree seats placed between the brackets and the wheels. The projectiles used in the C/98 howitzer are shrapnel and common shell with double-action fuzes. The number of the ammunition wagons is greater than that of ordinary field batteries, but on the other hand the ammunition supply of the limbers is less. The 15-centimetre howitzer of the heavy field artillery is nevertheless retained in the Service, and will be used against strongly entrenched and fortified positions.—*Jahrbücher für die Deutsche Armee und Marine.*

The *Allgemeine Militär-Zeitung* relates that a march manœuvre of 88 kilometres in 35 hours was accomplished a few days ago by the 1st Battalion of Count Moltke's Regiment of Fusiliers at Glatz.

The battalion, whose objective was the Schneeberg of Glatz, left at 5 o'clock in the morning of the 31st July in field service order. After having passed through Habelschwerdt, they extended in attack formation at the entrance to the Wöfel Valley, and had some soup at 11 a.m. at the mill at Urnitz. They had then done 31 kilometres. At 1 p.m. the men commenced the ascent of the mountain and at about 3.30 p.m. arrived at the cowhouse of the Schneeberg, where they deposited their valises, and continued the ascent to the spot where, a few weeks ago, the William Tower was erected. The battalion then immediately commenced the descent, and after half an hour's rest at the cowhouse the 1st and 2nd Companies started for Klessengrund and the 3rd and 4th for Wölfelsgund, where they respectfully bivouacked at about 6 o'clock in the morning. On the morning of the 1st August the two half battalions started independently for the village of Eisersdorf, to the south of which they had a short shamfight. After a meal taken on the ground the battalion started for their quarters, which they reached at 4 p.m. The *Allgemeine Militär-Zeitung* adds that the men arrived at their barracks exceedingly fit, although they had done, in addition to the manœuvring, 88 kilometres in 35 hours, part of it in the mountains. Not a single man fell out.

The report that the German Government were about to introduce machine guns into the Army is confirmed by the *Militär-Zeitung* in the following terms:—

The Jäger battalions of the Guard as well as some of the Jäger battalions stationed in Alsace, amongst them the Rhine Battalion No. 8, have this year received machine guns of the Maxim type. The machine guns, according to the description given of them in the different journals are, "Schiessmaschinen," similar to small guns whose carriage rests on two wheels. They may be carried or drawn by two men, and are specially meant to sweep certain fixed spaces of ground. The cartridges, to the number of 250, are fixed in a band, which unrolls rapidly from right to left across the machine, which allows the firing to continue without interruption and with great speed. One man is enough to point and work the piece. As long as he presses the two handles the machine launches the projectiles and the fire does not cease until the 250 cartridges of the band are exhausted. The machine guns are brought as close as possible to the position where they should come into action, on carriages drawn by horses, they are then carried or drawn by two soldiers up to the line of skirmishers, and rapidly placed

on the most favourable position. Two men carry by a strap some low iron receptacles containing several small boxes filled with cartridge bands.

Up to the present a "Provisional Regulation for Use and Keeping in Repair of Army Bicycles," dated 1895, has been in force. On the 12th May last this was replaced by a "Bicycle Regulation" (no longer provisional), which, in spite of its shorter title, contains more matter. This corresponds to the greater importance given nowadays to Army cycling.

One learns from the "description of the chief parts" of the military bicycle that the wheels are now provided with pneumatic tyres—the hollow tyre had been adopted in principle in 1895. In consequence of this innovation a telescopic air-pump is carried now in the tool pouch. The number of reserve pieces has been increased. The war bicycle (group A) is meant for field service, for route marches in broken country, for field manœuvres and for autumn manœuvres; war bicycle (group B) is intended for drill and all duties. New machines are no longer bought for instructional purposes. Chapters II. and IV. of the new regulation have been but little modified. In Chapter V. it lays down that the instruction should be by battalion or by regiment. The men of the first year are to be taught with a view to replacing those who are about to leave the Service. One-year volunteers can only be admitted as an exception. During the training the duration of the march is to be brought by degrees up to 4 hours. The principles regarding the use and importance of cycles are but little changed. The rule of not making use of cyclists except on the march is adhered to. Thirty to 40 kilometres in two hours is considered sufficient on a good road and in favourable weather. This pace may be greatly increased (in the provisional regulation it was limited to 30 kilometres). On good roads and for long distances the cyclist is superior in speed to the trooper (formerly it was said that the cyclist could never replace the trooper). As soon as the beginner has acquired sufficient skill, he must do from 1½ to 2 hours' training daily, and from that it is gradually increased to 4 hours. He is finally put through a course of quick riding, at first on roads, and then on beaten tracks; during these exercises he is even made to cycle off the roads and in the dark without a lamp. The regulation also contains instructions regarding saluting; when the streets are very crowded the salute is dispensed with. Rules to be observed on the march are added.

Several changes have been in the dress and equipment. The former weapon, the revolver, sufficed when the cyclist was looked upon merely as an orderly. This weapon has been replaced by the Model 91 rifle for infantry, and by the carbine for the cavalry. The rifle, Model 91, with which the artillery and balloonists are armed, is shorter and lighter than the infantry rifle, Model 88. An innovation in the dress is the adoption of a grey cloth waterproof cape with hood. The cloak and valise are carried by wagon. The trousers are worn with short leather leggings, and a new kind of laced boot has been adopted. A knitted vest is worn under the tunic. An appendix relative to keeping the machines in proper repair is added to the regulation; it contains the current prices for repairs, and a list of the various points to be examined before going out.

Cycling enthusiasts will, no doubt, feel disappointed in reading the new regulation, although it undoubtedly shows a better appreciation of the subject than formerly. In opposition to these prudent provisions may be placed the results obtained by the Bavarian bicycling course, from whom the greatest efforts were demanded, and the most important services rendered at the Imperial manœuvres of 1897. No cyclist detachment is detailed for the Imperial manœuvres of 1899, but a pioneer cycling group only will be attached to a cavalry division. These matters are better arranged in France; a cyclist company with a strength of 5 officers, 120 men, and 2 wagons has been formed from each of the army corps of Châlons and Nancy, and will take part in the autumn manœuvres. They use the folding bicycle and are armed with the carbine with the artillery bayonet.—*Berliner Neueste Nachrichten.*

A new substance called "Tropou" has lately been tried for the subsistance of men sent on patrol or scouting duty. The trial has been made by a small troop of 25 volunteers, commanded by a lieutenant, who completed for three days an average distance of 30 kilometres, sleeping in the open air at night. "Tropou" is a production made chemically by the works at Mülheim, and is in the form of a biscuit and chocolate, of which each man can carry three rations in his own mess tin, at the same time as he has in his haversack a special packet containing two rations of pea or bean soup. The men were well satisfied with this diet, which digested very well and was sufficiently sustaining to enable them to support the greatest fatigues. The weight of the three rations carried by a man does not exceed 1¼ lbs., instead of the 2 lbs., which is about the weight of the iron ration now used.—*Le Progrès Militaire.*

ITALY.—The effectives of the Italian Army were as follows on the 30th June, 1898:—

a. PERMANENT ARMY.		
Serving with the colours	310,602	
On unlimited furlough	503,857	
		814,459
b. MOBILE MILITIA.		
Railway employés liable to service	1,606	
Men of the 1st Class on furlough	357,441	
Railway employés of 2nd Class liable to service	401	
Men of the 2nd Class on furlough	107,908	
		467,356
c. TERRITORIAL MILITIA.		
Railway employés liable to service	5,394	
Men of the 1st, 2nd, and 3rd Class on furlough ...	1,936,524	
		1,941,918
Total		3,223,733

These are very large numbers, but their fighting strength would be sensibly diminished when mobilised, for men of the 3rd Class receive no military instruction. Nevertheless Italy could arm and embody an army of over 2,000,000 men who have received a more or less complete military instruction.—*La France Militaire.*

The Italian Government spared nothing this year, in order that the grand manœuvres might surpass in importance and in display anything that has previously taken place in the Peninsula. They wished to make up for the four years that had passed without grand manœuvres.

There were none in 1895, or in the succeeding year; the nation was mourning on account of the disaster at Adowa, which in itself, furnished a sad lesson to the officers of the Army. The 1897 motives of economy caused them to be suppressed, and last year it was considered undesirable to move troops from certain centres, where rioting might be expected.

The chief manœuvres, with regard to the strength of the effectives engaged, took place in the neighbourhood of Naples, under the direction of the Prince of Naples; but still more important were those which took place in Piedmont, under the supervision of General Leon Pelloux, brother of the President of the Council, and commander of the Genoa Army Corps. Commencing on the 1st September, after preliminary drills, they concluded on the 7th. The King, with his suite of military attachés, was present at the second period of the manœuvres.

This year, for the first time, the provisions of the law of 1897, on the mobilisation of the Reserve or Mobile Militia, and the institution of depôts in the districts, has been put in force. Thus, at the Piedmont manœuvres, a division entirely composed of reserves, of about 10,000 men, was represented. The mobilisation

was carried out fairly rapidly. The military authorities showed themselves accommodating, with regard to the exceptions, and the family of each reservist called to the colours received a subsidy of 80 centimes a day. The men showed themselves capable of bearing fatigue; they had previously trained for some days n camp.

The cavalry displayed a want of coolness in action. It was owing to this trait, that in an engagement where two regiments found themselves opposed to one another it wanted little to turn the sham into a real fight. The King had to at once give the signal to cease hostilities. It was the same thing with the infantry, after a bayonet charge, at Rio Riccardo. The soldiers were so heated and carried away by the action, that if it had not been for the officers, they would have struck one another. At this same affair at Rio Riccardo, they say that the artillery, on account of the fog and the rain that followed, fired until their ammunition was exhausted, without preventing the enemy from passing. Too much precipitation was shown in the advanced guards, who engaged in action, without a sufficient force behind, to support them.

The idea of the Piedmont manœuvres was the defence of Turin, against an army corps, coming from the south, and debouching by the valleys between the Stura and the Tanaro. The invading army (black), was under General Rugia, the national army (white), was commanded by General Bezozzi; the latter sustained a check, the advanced guard having brought on a premature action.—*Le Progrès Militaire.*

In the last grand manœuvres, Italy, for the first time, made trial of a regularly organised cyclist company; the results obtained were conclusive, as might have been foreseen. The complement of the Bersaglieri cyclist company consisted of 7 officers and 120 men; half the company were provided with folding and half with rigid machines. On several occasions the two sections with rigid machines had to abandon them, and were frequently put out of action on account of not being able to take to their bicycles again in time. The two sections with folding machines rendered excellent service, and in consequence a cyclist company to each army corps is about to be formed. In order to determine the model of the bicycle to be adopted in the Army the Minister of War has given orders for a long-distance ride of 2,000 kilometres, to be undertaken by a group of 20 Bersaglieri, commanded by a captain and a lieutenant. Trials will be made with 11 folding bicycles of the Costa and 11 of the Carraro model. This long-distance ride commenced on the 20th September, and will last for thirty-four days.

A cyclist section is also about to be formed in the 1st Engineer Regiment. This section is meant to look after the destruction of railways and telegraphs. With this object each soldier will carry with him, in a special pouch, a certain quantity of explosive gelatine. Each soldier is armed with a cavalry carbine, and carries his cartridges and rations with him. This new organisation of sapper cyclists will have a two-fold advantage for Italy—she can reserve her cavalry, not too numerous, for reconnaissance and scouting, and may intrust to men specially equipped for this purpose the delicate mission of destroying the enemy's railways and means of communication.—*La France Militaire.*

JAPAN.—The end of the year 1899 will be a most important one with regard to the development of the Japanese Army, when it will be apparent that the Imperial Decree of the 16th March, 1896, has been almost entirely carried out; for the year 1900 there only remains the completion of the increase in the artillery and engineers in order that the organisation of the Active Army, laid down in the above-named decree, will be fully carried out. The original time fixed for its completion was, therefore, about three years, and the grounds for this are apparent if the situation in Western Asia is closely looked into, and it is remembered that Russia calculates on the completion of the Trans-Siberian and Manchurian Railway in that time.

At the end of 1899, three Army commands, viz., the East, the Midland, and the West, consisting of 4 divisions each, will be ready, whilst the Guards' division remains under the immediate orders of the Mikado. The 13 divisions contain 26 infantry brigades of 2 regiments of 3 battalions each, 13 cavalry regiments of 65 squadrons, 13 field artillery regiments with 79 field and mountain batteries (which in 1900 will attain a full strength of 117 batteries with 39 groups of 3 batteries each), 13 pioneer battalions, consisting of at first, at the end of 1900, 28, and later, 39 companies, 13 military train battalions with 26 companies, 1 railway and 1 telegraph battalion of 3 companies each. Thus the infantry is almost doubled, the cavalry is fully doubled, and the field artillery will have trebled the number of its batteries at the end of 1900 (see May JOURNAL).—*Militär-Wochenblatt.*

PORTUGAL.—A Royal Order, of the 13th July last, promulgated the law for Military re-organisation, which has been voted by Parliament on the motion of Colonel Sousa Telles, the Minister of War. The 1st article stipulates that the Government is authorised to modify the organisation of the Army, within the limits mentioned hereafter, and that it must report to the Cortes all measures taken to ensure the execution of the law.

Territorial Division and Organisation of the Chief Command.—The continent will be divided, as formerly, into 4 divisional areas, each containing 6 regimental areas or recruiting and reserve districts. The adjacent islands will form 2 military commands, of which one (the Azores) will contain 2 recruiting and reserve districts, and the other (Madera) only 1.

Each divisional area will correspond to an Army division. At the same times the troops of one division may be detached to a divisional area other than their own. Troops not attached to divisions may be spread throughout the country according to the exigencies of the Service.

A division of the Army will have the following composition, viz.:—

2 infantry brigades of 3 regiments of 2 battalions each.
1 regiment of chasseurs of 3 battalions.
1 regiment of cavalry of 4 squadrons.
1 regiment of field artillery of 8 batteries.
1 company of engineers.

Troops not attached to divisions will form:—

1. *For Home Service:—*
   - *a.* 2 cavalry brigades of 2 regiments of 4 squadrons each.
   - *b.* A group of 2 horse artillery batteries, a group of 2 mountain batteries, and 2 regiments of foot artillery of 2 battalions each.
   - *c.* 2 pontoon companies, 1 telegraph, and 1 railway company.
2. *In the adjacent Islands:—*
   3 infantry regiments of 2 battalions each, and 3 companies of foot artillery.

Recruiting and Reserve.—Each recruiting and reserve district should guarantee the recruiting and mobilisation:—

1. Of the 2 infantry regiments (1 active and 1 reserve) that belong to it.
2. Of troops of other branches of the Service within limit of its resources.

Recruiting and reserve districts may be sub-divided, should the necessity arise.

The *personnel* of the recruiting and reserve districts will be formed by permanent staff of infantry and reserve regiments, and the 27 regimental the and district commands will be exercised by 9 colonels, 9 lieut.-colonels, and 9 majors belonging to the infantry. All the working of the recruiting, including the distribution of the contingent, will be under the War Department. Young men who have been enrolled, and who, not having the necessary means to get excused from service, follow a course of superior instruction, no longer enjoy the privilege of demanding a respite; they will pass at once into the 2nd Reserve

after 6 months' active service, if they pass a qualifying examination for the rank of an officer or non-commissioned officer of the Reserve. The duration of 6 months' service may be divided into two equal annual periods.

The active term of service remains fixed at 3 years. The War Minister, however, will have the power to reduce it to 2 years. The term of registry for the 1st Reserve is not altered (5 years). In the 2nd Reserve the term of registry will be increased from 4 to 7 years; during the last three years of their service the reservists are, however, excused from attendance at manœuvres or reviews. The total length of military obligation will thus be found raised from 12 to 15 years.

In peace-time the men of the 1st Reserve may be called out for the maintenance of public order; they will be subjected to 2 instructional periods of 30 days. The men of the 2nd Reserve who have served in the Regular Army are liable to 2 instructional periods of 20 days; those who were posted to the Reserve on enrolment must undergo a period of instruction of 30 days during the 1st, 2nd, or 3rd year of service, as well as 3 instructional periods of 20 days commencing from the 4th year of their service. The Reserve units consist of:—

1. *For Home Service:—*
   - *a.* 24 infantry regiments of 2 battalions each.
   - *b.* 8 groups of 2 cavalry squadrons.
   - *c.* 4 groups of field artillery of 4 batteries each and 2 battalions of foot artillery.
   - *d.* 2 companies of engineers, and 1 pontoon, 1 telegraph, and 1 railway company.
2. *In the adjacent Islands:—*
   3 infantry regiments of 2 battalions each and 3 companies of foot artillery.

Census of and Requisitioning for Animals and Carriages.—In each divisional area, a board will be constituted, presided over by a colonel or lieut.-colonel of cavalry, for the census of and the requisitioning for animals and carriages in the event of an Army mobilisation.

War Effectives.—Thanks to the preceding dispositions the Minister for War hopes to obtain a mobilised effective of 148,000 men, 84,000 for the Active Army and 64,000 for the reserve, grouped into 8 Army divisions, 4 being Reserve.—*Bulletin de la Presse et de la Bibliographie Militaires.*

RUSSIA.—The grand manœuvres of the Poland District commenced on the 4th September and were on a very large scale. These manœuvres took place this year partly in the governorship of Kalich, and for the greater part in that of Varsovie. The troops taking part in them belonged to the Vth and XVth Army Corps, to the IInd Cavalry Corps, to the 3rd Guard's Infantry Division, to the 1st Chasseur Brigade, and to the 46th and 48th Reserve Brigades, with the artillery and engineers attached to them. Cavalry also, which did not belong to the army corps nominated for the manœuvres were called out, as well as various non-combatant branches, such as the military telegraph, military train battalions and gendarmerie detachments. There were on the manœuvre ground a total of 107 battalions, 102 squadrons or sotnias, and 350 guns, which made up an effective of about 75,000 men and 12,500 horses, that is to say, a Regular Army capable of acting independently.

All these troops were divided into two army corps; the Western or Vth Army Corps under the command of the Cavalry General Bodisco; and the Eastern or XVth Army Corps under command of the Infantry General Komaroff. Prince Imeretinsky was charged with the general supervision of the operations.—*La France Militaire.*

SWEDEN.—The ordinary and extraordinary budgets of the Swedish Army for 1900 amounted respectively to 27,457,656 and 6,408,372 crowns, as against 26,528,460 and 5,431,900 crowns for the year 1899.

ORDINARY BUDGET.

The total increase is 929,196 crowns on last year's budget. The credits are divided as follows :—

		Crowns.
1.	Pay and allowances	10,193,822
2.	Remounts and hire of horses	326,660
3.	Schools	417,930
4.	Food supplies, *matériel*, drills	10,699,561
5.	For diminishing the expenses of the Rustning and the Rotering	3,715,900
6.	Sundry credits	2,103,783
	Total	27,457,656

EXTRAORDINARY BUDGET.

		Crowns.
a.	Temporary increase in the pay of N.C.O.'s	315,000
b.	Application of the law on military service	53,000
c.	Acquisition of new small-arms	2,388,000
d.	Establishment of a range for the Göta Artillery Regiment	100,000
e.	Trials with new field guns, purchase of ammunition and necessary *matériel*	235,000
f.	Strengthening of existing fortifications	2,200,000
g.	Commissariat supplies	709,072
h.	Sundry expenses	408,300
	Total	6,408,372

That is to say, an increase of 976,492, crowns on last year's Extraordinary Budget.

An examination of these credits gives rise to the following observations :—

Acquisition of New Small-Arms.—In 1896 the Riksdag recognised the necessity of providing the Army with 200,000 repeating Mauser rifles, of which 100,000, meant for the troops of the first line, were to be manufactured in the State works, and delivered in the course of 5 years, at the rate of 20,000 a year. Not a single rifle was delivered either in 1897 or 1898; 15,000 will be made this year in the works, and 20,000 in each of the two following years. In order to guard against the delay which has thus resulted, 40,000 rifles have to be ordered from the Mauser firm. The Swedish Army will thus have :—

At the end of	1899	55,000	small-bore rifles.
,, ,,	1900	75,000	,, ,,
,, ,,	1901	95,000	,, ,,

The Strengthening of Existing Fortifications.—The programme for the completion of the fortifications laid down by a commissioner appointed in 1897 has been definitely fixed on the following basis :—

	Crowns.
Stockholm (Vaxholm, Oskar-Fredericksborg) ...	3,377,644
Karlsborg	2,443,400
Karlskrona	5,453,850
Boden	8,700,000
Färosund and Tengstädt (Gotland)	1,028,700
Göteborg	3,192,000
Total	24,195,594

Of this total, 3,200,000 crowns were voted in 1899 (for Karlsborg, Färosund, and Göteborg), and 3,000,000 crowns (2,200,000 for the Army and 800,000 for the Navy) to the Budget for 1900. This last credit is meant for Stockholm, Karlsborg, Karlskrona, and Färosund. Parliament refused the credit asked for by the Government for the trial of a complete mobilisation of one of the army divisions —*Revue Militaire.*

SWITZERLAND.—The autumn manœuvres of the Swiss Army have just been concluded ; the last two days, the 12th and 13th September, were given up to operations, executed by the 1st Army Corps against a mixed division furnished by the 2nd Army Corps. The scheme given by Divisional Colonel Bleuler, who took command of the troops for the two days, was as follows :—

"A Southern Army has penetrated to Bas-Valais and the Jura, its outposts reaching Bulle and Moudon. One of its columns, detached of the Col du Pillou, has reached the district of Thonne ; its strength is a mixed division.

"A Northern Army assembles towards Fribourg ; one of its army corps (the 1st) being left behind finds itself between Morat and the Sarine. This army corps crosses the Sarine in three columns on the 12th September, viz., by the Schifenen bridge and by bridges constructed by the engineers at Bösingen and Boun-Bad ; it marches to oppose the enemy in the direction of Schwazenbourg." The march and the fights on the 12th and 13th September gave most satisfactory results. In spite of the rain and the cold the troops were in excellent spirits and were remarkable for their discipline and bearing. The dispositions taken by Colonel Isler, who commanded the mixed division, were most skilful, and brought about some interesting collisions.

The directors of the manœuvres criticised the paucity of exact information sent by the cavalry, the slowness of the infantry deployments, and the exaggerated length of the fighing line of the divisions. The troops complained greatly of the service of the ration supplies. Considerable delays, caused by defective orders or by wrong directions given to provision columns, placed several corps under the necessity of contenting themselves with bread and cheese for several days running.—*Revue du Cercle Militaire.*

UNITED STATES.—While at Sandy Hook recently, the Secretary of War inspected the fortifications and observed the working of several of the new type guns. He was particularly interested in the new mountain gun, which is now under consideration for use in the Philippines. It is the Secretary's intention to form a full mountain battery of these guns to be transported on mule back. Already several hundred mules have been sent to the Philippines, and it is proposed to use some of them to carry these guns. Four mules are assigned to a gun, two of them carrying the ammunition and the other two carrying the gun mechanism, and wheels and carriage. The new gun has commended itself to the Department by reason of its extreme simplicity of design, the comparative lightness of its weight, the ease with which it may be dismounted for pack transport and the extreme measure of efficiency which it has developed in active service in the hands of British troops. It shoots a projectile weighing 12½ lbs., with a muzzle velocity of 950 foot-seconds, while by decreasing the muzzle velocity about 100 foot-seconds it has been found possible to fire shells weighing 20 lbs. each. The gun has been adopted by the British Government, and was used in the Soudan campaign, where six batteries were employed. They were also used with considerable success in the Omdurman and Khartoum campaigns. The entire equipment weighs 873 lbs., including mount and trail, and when dismounted is easily carried by four mules. The gun is designed for firing shrapnel, and can also be used for firing 20-lb. shells filled with bursting charges and incendiary stars, which set fire to buildings and huts. Its mechanism is very simple, consisting of only nine parts, and it can be taken apart and assembled

without the use of any tool. It is the only gun of its kind that possesses efficient mounting for checking the recoil of the gun when fired.

Upon an order from the War Department, Maxim & Co., of London, have delivered one of these guns to the United States, and it is now at Sandy Hook, where it has been tested with over four hundred rounds of ammunition and proved highly satisfactory.

The Chicago newspapers report that Major R. P. Davidson, of the North Western Military Academy, will start for Washington on September 15th "with an automobile gun carriage, carrying a Colt automatic gun." This gun has just been completed by the Durgeas, of Peoria, Ill. It will be propelled by a 6-H.P. gasoline motor, and its weight is about 1,000 lbs. The cost will be something like $1,500. It will have three rubber-tyred wheels, two behind and one in front, with seats over the rear axle for four gunners, side bars being provided as on a gun caisson, to which the men may cling when the cannon carriage is driven into action. The gun is carried on a triangular frame in front of the seat with a muzzle pointing forward, so that the gunners may operate it with the carriage going 30 miles an hour. The body-work of this vehicle has already been thoroughly tested. It is said that 2,000 rounds of ammunition will accompany the gun, together with "all of the necessary tools for repairing breakdowns, some duplicate parts where weakness is suspected, and a supply of gasoline sufficient to carry it for several days." In addition a device will be attached by which the machine may be extricated from ditches and other places insurmountable by means of its own power of propulsion.—*U.S. Army & Navy Journal.*

NAVAL AND MILITARY CALENDAR.

SEPTEMBER, 1899.

2nd (Sat.) Launch of battle-ship "Herluf Trolle" at Copenhagen for Danish Navy.

,, ,, H.M.S. "Grafton" arrived at Plymouth from China.

5th (T.) H.M.S. "Andromeda" commissioned at Portsmouth for Mediterranean.

6th (W.) Launch of torpedo-boat destroyer "Viper" from Hawthorne and Leslie's Yard, Newcastle-on-Tyne.

,, ,, 2nd Bn. Lancashire Fusiliers left Malta for England on the "Jelunga."

7th (Th.) Launch of third-class cruiser "Infernet" from the Chantiers de la Gironde, Bordeaux, for French Navy.

8th (F.) A Cabinet Council was held and it was decided to send a despatch to the Transvaal Government demanding a definite reply to the British proposals, and to despatch 10,000 additional troops to South Africa.

9th (Sat.) Captain Dreyfus was re-condemned by 5 votes to 2 by the Rennes Court-Martial and sentenced to 10 years' detention in a fortress.

11th (M.) The French Foureau-Lancy Mission reported to have been attacked and exterminated by a body of Tuaregs at the oasis of Air, about 250 miles N.W. of Lake Chad.

12th (T.) Boiler burst on board German despatch-vessel "Wacht," killing four men and injuring four others.

13th (W.) 2nd Bn. Royal West Kent Regiment left England for Egypt on the "Avoca."

14th (Th.) 1st Bn. Manchester Regiment arrived at Durban from England on the "Goth."

15th (F.) 1st Bn. Royal Munster Fusiliers arrived at Cape Town from Ireland on the "Arundel Castle."

,, ,, 2nd Bn. Lancashire Fusiliers arrived in England from Malta on the "Jelunga."

16th (Sat.) 1st Bn. Northumberland Fusiliers, the 9th, 15th, and 31st Companies Army Service Corps, and the 4th Company Army Ordnance Corps left England for Natal on the "Gaul."

,, ,, Lieut.-General Sir George White, G.C.B., G.C.S.I., G.C.I.E., V.C., and his Staff, left England for Natal on the "Tantallon Castle."

17th (S.) The 42nd Battery Royal Field Artillery left India for Durban on the "Secundra."

18th (M.) H.R.H. the Prince of Wales presented new Colours to the 1st Gordon Highlanders at Ballater.

,, ,, 21st Battery Royal Field Artillery and 26th Company Field Hospital Corps left India for South Africa on the "Lalpoora."

,, ,, 2nd Bn. King's Royal Rifles left India for South Africa on "Purnea."

,, ,, Reply received from the Transvaal Government rejecting British proposals.

19th (T.) H.M. the Queen reviewed the 1st Bn. Gordon Highlanders at Ballater.

,, ,, The President of the French Republic granted a pardon to Captain Dreyfus.

,, ,, 1st Bn. Royal Sussex Regiment left England for Malta on the "Sumatra."

,, ,, The 53rd Battery Royal Field Artillery left India for South Africa on the "Booldana."

,, ,, H.M.S. "Terrible" left Portsmouth for China.

20th (W.) Captain Dreyfus was released from the prison at Rennes at 3 a.m.

,, ,, 2nd Bn. Loyal North Lancashire Regiment left England for Malta on the "Jelunga."

,, ,, A Section of the Telegraph Battalion R.E. left England for Natal on the "Jelunga."

,, ,, An Ordnance Park and a British Field Hospital left India for South Africa on the "Hensada."

,, ,, Launch of first-class armoured cruiser "Amiral-Gueydon" from Lorient Dockyard for French Navy.

,, ,, Launch of first-class armoured cruiser "Idzumo" from Elswick Yard for Japanese Navy.

21st (Th.) President Steyn of the Orange Free State counselled the Raad to take part with the Transvaal in the event of hostilities.

,, ,, The 15th Hussars left England for India on the "Simla."

,, ,, Head-Quarters and 4 Companies 1st Bn. Devonshire Regiment left India for South Africa on the "Sutlej."

,, ,, Four companies 1st Bn. Devonshire Regiment left India for South Africa on the "City of London."

,, ,, One Squadron 19th Hussars left India for South Africa on "Vadala."

,, ,, Launch of first-class battle-ship "London" at Portsmouth.

22nd (F.) A Cabinet Council was held and a despatch forwarded to the Transvaal Government stating that the British Government would now formulate their own proposals for a settlement.

,, ,, One squadron 19th Hussars left India for South Africa on the "Pandura."

23rd (Sat.) 2nd Bn. Royal West Kent Regiment arrived in Egypt from England on the "Avoca."

,, ,, 3rd Bn. Grenadier Guards left England for Gibraltar on the "Nubia."

,, ,, 2nd Bn. Gordon Highlanders and one squadron 19th Hussars left India for South Africa on the transports "Palitana," "Sirsa," and "Warora."

23rd (Sat.) H.M.S. "Andromeda" left Portsmouth for Mediterranean.
24th (Sun.) 1st Bn. Royal Irish Fusiliers left Egypt for Natal on the "Avoca."
25th (M.) A succession of earthquake shocks followed by rain and landslips occurred at Darjeeling. Over 400 Europeans and natives were killed and much property destroyed.
" " 1st Bn. Gloucester Regiment left India for South Africa on the "Indian."
" " The 9th Lancers left India for South Africa on the transports "Wardha," "Nowshera," and "Nairung."
26th (T.) One squadron 5th Dragoon Guards left India for South Africa on the "Lindula."
27th (W.) 3rd Bn. Grenadier Guards arrived at Gibraltar from England on the "Nubia."
" " 1st Bn. Royal Sussex Regiment arrived at Malta from England on the "Sumatra."
28th (Th.) The Orange Free State resolve to support the Transvaal Government.
" " The 18th, 62nd, and 75th Batteries Royal Field Artillery left England for Natal on the "Zibeughla," and "Zayathla."
" " 1st Bn. Border Regiment left Malta for Cape Town on the "Sumatra."
" " 2nd Bn. Grenadier Guards left Gibraltar for England on the "Nubia."
" " An ammunition column left India for South Africa on the "Nevassa."
29th (F.) Her Majesty the Queen presented new Colours to the 2nd Bn. Seaforth Highlanders at Balmoral.
" " Bhils attacked some native infantry on the borders of Baroda and forced them to retire.
" " 2nd Bn. Loyal North Lancashire Regiment arrived at Malta from England on the "Jelunga."
" " 1st Bn. Lancashire Fusiliers left Malta for Crete on the "Jelunga."
" " A Cabinet Council held to decide on the situation in the Transvaal.
30th (Sat.) A Balloon Section Royal Engineers, and No. 5 Company Army Service Corps, and a Remount Company (500) horses left England for South Africa on the "Kinfaun's Castle."
" " A special ammunition column left England for Cape Town on the "Gaika."
" " H.M. Gun-boat "Widgeon" paid off at Cape Town.

FOREIGN PERIODICALS.

NAVAL.

ARGENTINE REPUBLIC.—*Boletín del Centro Naval.* Buenos Aires: August 1899.—Has not yet been received.

AUSTRIA-HUNGARY.—*Mittheilungen aus dem Gebiete des Seewesens.* No. 10. Pola: October, 1899.—"The Adriatic Sea Fisheries, with special regard to the Austro-Hungarian coasts" (*continued*). "The Compensation of the Quadrantal Deviation by the help of Deflectors." "On the Use of High Explosives." "Foreign Naval Notes."

BRAZIL.—*Revista Maritima Brazileira.* Rio de Janeiro: August, 1899.—Has not yet been received.

FRANCE.—*Revue Maritime.* Paris: August, 1899.—Has not yet been received.

Le Yacht. Paris: 2nd September, 1899.—"The Danger of Derelicts." "Yachting Notes." "The New Mail Steamer 'France.'" "The Merchant Navy, French and Foreign." 9th September.—"The Abolition of the Lieutenant de Vaisseau Majors." "Yachting Notes." "Annual Meeting of the Institution of Naval Architects." 16th September.—"The English Naval Manœuvres." "Yachting Notes." "The Mercantile Marine, French and Foreign." 23rd September.—"Death of Vice-Admiral Sallandrouze de Lamornaix." "The Transformation of our Second-class Battle-ships." "Shore Service of Naval Officers." "The Third-class Cruiser 'Infernet.'" "The Leviathans of the Merchant Navies." 30th September.—"An Annual Fête for our Navy." "Yachting Notes." "The Breveted Naval Officers of the Superior School of Electricity." "The Increase of the English Fleet." "The New Trans-Atlantic Mail-boat 'Lorraine.'" "Employment of Kites to Assist Ships in Distress." "'Goubet No. 2' at Toulon."

Le Moniteur de la Flotte. Paris: 2nd September, 1899.—"The Certificated Junior Officers of the Merchant Navy." "The Inspector-General of the Maritime Fisheries." "Colonial Notes." 9th September.—"The 'Infernet' and 'Lucas.'" "The Port of Libau." "Abolition of the Lieutenants de Vaisseau Majors." 16th September.—"River Navigation in Germany." "Shore Service of Naval Officers." "Colonial Notes." 23rd September.—"Shore Appointments." "The Late Vice-Admiral Sallandrouze de Lamornaix." "The Atlantic-Mediterranean Canal.' "The Voulet-Chanoine Mission." 30th September.—"The Corsairs of Boulogne." "The Funeral of Vice-Admiral Sallandrouze de Lamornaix." "Colonial Notes."

La Marine Française. Paris: 15th September, 1899.—"The English Naval Manœuvres." "Explorers." "The Italian Navy and the Programme of New Constructions." "The Strategical Position of Persia and British Interests." "The Civilian Workpeople at the Arsenal and Dockyards."

GERMANY.—*Marine Rundschau.* Berlin: August-September, 1899.—"Frontispiece: The Danish Ironclad 'Iver Hvitfeldt.'" "The Instructions issued by the United States Naval Authorities for Blockading Ships and Cruisers." "Electro-Motors for Steering Engines, and Range-Finders." "Coal Supplies in Naval War." "The United States Factory-Ship 'Vulcan.'" "The Babcock-Wilcox Water-tube Boilers and their Use in the Navy." "The Weather in the Kiau-Chau Territory during the Winter Months, October, 1898, to March, 1899." "The Etappen Routes of England to India and the Cape of Good Hope" (*concluded*). "Proverbs and Proverbial Methods of Speech about Seamanship and Sea and Fishing Life in the German Language" (*continued*).

ITALY.—*Rivista Marittima.* Rome: August, 1899.—"European Interests in China." "Notes on Firing." "About the Froude Tank." "The Organisation of the Consular Service." "Nomogrammes of the Curves of Altitude." "Acoustic Signals." "Nomography in Relation to Ballistics." Letters to the Director:—"On Naval Tactics." "What Some Nations have Gained by the Increase of their Navies and Mercantile Marine." "In Defence of Torpedoes." "Ships in Commission and in Reserve." "Naval Notes."

September, 1899.—"Influence of the Distance between the Positions of the Screws on the Propulsion of Ships." "The Suez Canal." "The Seaman and Sociology." "The Seventh International Navigation Congress." Letters to the Director:—"On Economy in the Dockyards." "A Note on the Problem of Naval Tactics." "Naval Notes."

PORTUGAL.—*Revista Portugueza, Colonial e Maritima.* Lisbon: September, 1899.—Has not yet been received.

SPAIN.—*Revista General de Marina.* Madrid: September, 1899.—"Arctic Regions." "Liberty of the Flag in Time of War." "The Mounting of Marine Engines" (*continued*). "Some Studies of the Medical Service on board Ships in Expectation of War." "Society of Mechanical Engineers." "Libraries on board Ship." "Scientific Investigation." "Coast Defence." "England and the Transvaal Republic." "San Sebastian." "The Practical Masters of Torpedo Boats."

MILITARY.

AUSTRIA-HUNGARY.—*Militär-Zeitung.* Vienna: 5th September, 1899.—"A Premium on Insubordination." "Motor Cars in this Year's Manœuvres." "The Imperial Manœuvres in Bohemia." 13th September.—"The New Service Bounty." "Reconnoitring—Screening." "Reflectors." 21st September.—"The Officer in Society." "The Manœuvres of the 3rd and 14th Army Corps." "Re-introduction of the Machine Gun into France." 29th September.—"A Crossing of the Alps by an Infantry Division." "Recruit Training." "His Majesty the Emperor at Berndorf." "England and the Transvaal."

Organ der Militär-wissenschaftlichen Vereine. Vienna: September, 1899.—"New Trials in Photography, and especially in Photography in Natural Colours." "The Fostering of History in the Army."

Mittheilungen über Gegenstände des Artillerie- und Genie-Wesens. Vienna: September, 1899.—"Permanent Fortifications and Sieges."

BELGIUM.—*Bulletin de la Presse et de la Bibliographie Militaires.* Brussels: "'Tactics,' by Balck" (*continued*). "The Grand Manœuvres in France in 1898" (*continued*). "Strategic and Tactical Problems." 30th September.—"The Country, the Men, and the Arms for War." "The Complete Combat."

FRANCE.—*Revue du Cercle Militaire.* Paris: 2nd September, 1899.—"Colonial Troops." "Artillery Scouts" (*concluded*). "The Broad Arrow Problems." 9th September.—"Reflections on Baggage-trains." "Colonial Troops" (*continued*). "Foreign Tactics—Germany—The War Academy: Examination for Admission in 1899" (with map). "The New Italian Cavalry Musketry Instructions." 16th September.—"General Détrie." "Reflections on Baggage-trains" (*concluded*). "Colonial Troops" (*concluded*). "Sinope—Sebastopol." 23rd September.—"Field Manœuvres" (with sketch). "Artillery—Examination of the Regulations of the 18th July, 1898." "The Re-organisation of the Portuguese Army." 30th September.—"Field Manœuvres" (with map, *concluded*). "Artillery—Examination of the Regulation of the 18th July, 1898" (*concluded*). "A Russain Fable."

Le Spectateur Militaire. Paris: 1st September, 1899. "The Grand Manœuvres" (*continued*). "Humane Bullets and their Wounds." "Considerations for the Defence of Algeria-Tunis, and the African Army" (*continued*). "Recollections of Madagascar" (5 sketches, *continued*). 15th September.—"The Grand Manœuvres" (*concluded*). "Humane Bullets and their Wounds" (*concluded*). "Deciphering Major Deltheit's Cryptography without Instruments." "Considerations for the Defence of Algeria-Tunis, and the African Army" (*continued*). "Recollections of Madagascar" (3 sketches, *continued*).

Revue d'Artillerie. Paris: September, 1899.—"Distribution of Artillery Fire" (*continued*). "Acetylene and its Uses." "The Italian Field *Matériel* 9 B, ret. Mod. 80/98." "Siege Range-Laying Scale—Circular Graduations."

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(*concluded*). IV.—The Staff." "Field Artillery." "The War of Succession in Austria (1740-1748)—The Campaign of Silesia (1741-1742)" (*continued*). "The Marshals de Tessé, de Villars, and Berwick in the Alps (1707-1710)."

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GERMANY.—*Deutsche Heeres-Zeitung.* Berlin: 2nd September, 1899.—"General Considerations of the Defensive Works at Havanah." "Tactical and Strategic Considerations of the Græco-Turkish War of 1897" (*concluded*). "Coast Defence" (*concluded*). "The Employment of Cavalry" (*concluded*). 9th September.—"The French Soudan and its Soldiers." "The Memoirs of the French General Marcellin de Marbot, 1789-1815." "Changes in the Organisation of the French Foot Artillery of the 1st July, 1899." "On Tactics of the Sanitary Service on the Battle-field." 16th September.—"The Scientific Training of Officers." "Memoirs of the French General Marcellin de Marbot, 1789-1815" (*concluded*). "On Tactics of the Sanitary Service on the Battle-field" (*concluded*). "A Supplement to the Improvement of the Non-commissioned Officer." 20th September.—"Italian Naval Projects." "Admiral Cervera's Opinion of the Spanish Fleet in the last War." "A Cavalry Division in the year 1814." 23rd September.—"Field-Marshal William, Duke of Württemberg." "Admiral Cervera's Opinion of the Spanish Fleet in the last War" (*continued*). "A Cavalry Division in the year 1814" (*continued*). 27th September.—"Field-Marshal William, Duke of Württemberg" (*concluded*). "Admiral Cervera's Opinion of the Spanish Fleet in the last War" (*continued*). "A Cavalry Division in the year 1814" (*continued*). 30th September.—"Political and Military Sundries." "Admiral Cervera's Opinion of the Spanish Fleet in the last War" (*continued*). "A Cavalry Division in the year 1814" (*continued*).

Militär-Wochenblatt. Berlin: 2nd September, 1899.—"Stories of Waterloo" (*continued*). "The French Cavalry Drill and Manœuvre Regulations of the 12th May, 1899" (*concluded*). "England and the Transvaal." 6th September.—"The Combined Autumn Manœuvres of the South German Contingents from Württemberg, Baden, and Hesse, 1840 to 1899." "Stories of Waterloo" (*concluded*). "From the Russian Field Artillery School of Gunnery." 9th September.—"War Experience, Manœuvre Experience, Theory." "Scouting in War." 13th September.—"War Experience, Manœuvre Experience, Theory" (*concluded*). "Motor Wagons for Campaign Purposes." "Proposed Re-introduction of Machine Guns in France." 16th September.—"Signalling in the Cavalry." 20th September.—"Lieutenant-General von Schwartzkoppen on the 16th August, 1870—My Reply to Fritz Hönig's 'Truth About the Battle of Vionville—Mars la Tour.'" "The Japanese Army." 23rd September.—"The Effects of Railways at the Imperial Manœuvres" (with sketch). "Lieutenant-General von Schwartzkoppen on the 16th August, 1870—My Reply to Fritz Hönig's 'Truth About the Battle of Vionville—Mars la Tour'" (*concluded*). "The English Expeditionary

Force in the Event of a War with the South African Republic." 27th September. —"The Seventh International Geographical Congress at Berlin in 1899." "Annuaire de l'Armée Française pour 1899." 30th September.—"The New Field Artillery Drill Regulations." "Riding for Prizes."

Jahrbücher für die Deutsche Armee und Marine. Berlin: September, 1899.— "Strategic Retrospect of the Events in the South-Eastern Portion of the French Theatre of War in December, 1870, and January, 1871" (*concluded*). "The Russians on the Shipka in the Winter of 1877-78" (*concluded*). "The Drawing up of Orders" (*concluded*). "Chief Pleadings according to the New German Military Rules of Procedure."

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ITALY.—*Rivista di Artiglieria e Genio.* Rome: September, 1899.—Has not yet been received.

Rivista Militare Italiana. Rome: September, 1899.—Has not yet been received.

RUSSIA.—*Voïénnyi Sbórnik.* August, 1899.—"The Potiechnyïé and the Origin of the Préobiajensky Regiment" (*concluded*). "War" (*continued*). "The Military Step." "Questions of Cavalry Technique." "Report on Field Artillery Tactics according to Foreign Regulations." "The Strengthening of Stations for Commercial and Military Traffic." "Open-air Work by Soldiers from a Sanitary Point of View." "The German Military Schools." "Education of the Young with the Don Cossacks." "Description of the Pamir." "The Admission of Sick Officers to the Imperial Sanitorium of Finland." "The Italian Budget and Military Reform."

September, 1899.—"The Ideas of Peter the Great on the Subject of the Establishment of a Military Port on the Baltic." "Galician and Bosnian Gangs in the Insurrection of 1865 in Poland." "War" (*continued*). "Artillery Notes." "Results of the Meeting of the 2nd Section of the 1st International Agricultural Congress at St. Petersburg in 1899, on the Subject of the Training of Pigeons." "Our Military Teaching and Education." "Punishment of Militiamen absent from Assembly." "Description of the Pamir" (*continued*). "The New German Military Law and its Execution."

SPAIN.—*Memorial de Ingenieros del Ejército.* Madrid: September, 1899.—Has not yet been received.

Revista Técnica de Infantería y Caballería. Madrid: September, 1899.— Has not yet been received.

SWITZERLAND.—*Revue Militaire Suisse.* Lausanne: September, 1899.— "The Battle of Aix, B.C. 102." "Road Locomotives and Motor Cars for Military Field Transport." "The Swiss Mountain Artillery" (with three photographs). "The Manœuvres of the 1st Swiss Army Corps in 1899."

NOTICES OF BOOKS.

BALCK'S TACTICS, PART II.—COMBINED TACTICS. (*Balck Taktik, II. Theil. Angewandte Taktik.*) Post 4to, pp. 565. Berlin: R. Eisenschmidt, 1898.

In the July number of the JOURNAL the first part of this work was noticed. Part II., now under review, is no less worthy of commendation for the thorough way in which the subject is treated. It is impossible in the space available to do more than briefly indicate the nature of this part of the work, which embraces many matters of great importance to the operations of war not usually touched on in works on Tactics, such as the influence of the country and seasons of the year on the conduct of war, the organisation of armies, army corps, divisions, cavalry divisions, trains, etc. A historical *résumé* showing how this organisation was brought about in France, Prussia, Germany, Austria, and Russia is of great interest. The proper strength of these different bodies, and the proportion of artillery with each, etc., are fully discussed. The various methods of obtaining information in war by means of spies, war correspondents, and of conveying information are described and illustrated by incidents from military history. A valuable chapter on the chief points which influence commanders in the field in coming to decisions, and on the framing of orders follows. One of the best chapters is that on marches, which is, in fact, a regular essay on the subject, illustrated by numerous examples from war. In all this, the writer quotes his authorities, and he is not only extremely well read, but has evidently great experience in imparting knowledge tersely and clearly. These examples are not entirely confined to the campaigns of 1866 and 1870, though, as the author remarks, it is difficult to cite examples from the military history of former campaigns, as, even when taken from the best accounts, these are often so deficient in the *data* necessary to enable one to form a judgment thereon, such as the strength of the marching bodies, the actual distances covered, the state of the roads, weather, etc., that they are deprived of half their value.

The use of railways in war is illustrated by examples, the chief of which are, of course, taken from the concentration of the German and French Armies in 1870. Details are fully gone into, and the German, French, English, and Russian regulations for the transport of troops given. In regard to this, as in some other instances, his quotations from the English regulations are not quite up to date, but it needs a very smart man indeed to keep pace with our chameleon-like regulations. We are scarcely a month or two without some more or less radical changes. We are much in need of a short comprehensive book of "Field Service Regulations" on the model of the German "Felddienst." Where local conditions necessitated deviation from this, the chief local authority could be empowered to modify the regulations, as in India, but any tendency to *over*-regulate should be avoided.

Sea transport is necessarily but briefly treated, as the German Armies have little or no experience of this. The requirements are gathered from English sources. "The Soldier's Pocket Book," "Staff Duties," etc., and the chief examples given are: Abercrombie's Landing in Aboukir Bay in 1801, the Landing of the Crimea in 1854, the Expedition to Egypt 1882; but the details of the Japanese Expedition to China in 1894-5 are also given from a French source.

Over 50 pages of closely printed matter are devoted to the all-important subject of *outposts*, which is exhaustively treated. The German outpost system as laid down in the "Felddienst-Ordnung" is fully described. The methods adopted by Austrian, Italian, French, and Russian Armies are more briefly sketched, each

being illustrated by very rough diagrams. Foreign outpost systems do not appear to differ materially in principle from what they were in 1881, when (March 25th) Colonel Lonsdale Hale described them in an admirable lecture in the R.U.S. Institution, only Captain Balck gives more particulars, from which it appears that the present German methods are somewhat similar to our own. He gives outlines for advanced guard and outpost orders. The Germans as a rule assign one outpost company (250 men) to each main road on the line of advance, which covers in average ground a front of about 1½ miles. A battalion is scarcely ever called on to furnish more than two companies on outpost duty, nor to cover more than about three miles of front. The outpost companies send forward two *Feldwachen* (answering to our piquets), to cover important roads, or three or four N.C.O. posts of four to eight men to guard the flanks, keep up communication, etc., watch less important approaches, etc. Often such small posts alone suffice. In Germany, cavalry are much used for outpost work. Even at night they are expected *always* to keep touch with the enemy by means of patrols, especially in case of the withdrawal of the hostile force, and to keep all infantry outposts and detached parties well informed as to what is going on in front. Cavalry outpost service is detailed, whole paragraphs of the "Felddienst-Ordnung" being quoted verbatim, as on pp. 401 and 402. This increases the bulk of the book under review unnecessarily, as every officer must have the "Felddienst-Ordnung."

The author recommends a study of Hönig's "Volkskrieg" detailing the outposts of the Xth Corps before the battle of Beaune-la-Rolande, and also that of von Gizycki's "Strategio-tactical Problems," Vol. VII. He advises "listening patrols" being pushed out along all roads leading to the enemy. He shows the necessity of alert "battle outposts," quoting the example of the German outposts across the Rezonville road after the battle of Vionville on 16th August, 1870, where the outposts of the hostile forces were only from 700 to 1,400 yards apart. Here, of the two regiments in first line, one pushed forward a battalion on outpost duty, having two companies thrown out as a "line of observation." Of these one company simply lay down in extended order, the other had one "zug" broken up into independent N.C.O.'s parties, which kept up constant intercommunication. On the other hand, 25 battalions of the IIIrd Corps after Orleans on 3rd December, 1870, fearing a night attack, kept 14 battalions on outpost duty. The arrangements depend on the enemy's position, condition, spirit, etc. In all cases, however, the line of observation and line of resistance on the battle-field nearly coincide, and artillery and cavalry are necessarily withdrawn to the rear on the battle-field.

Well-trained troops of siege outposts can by vigilant patrolling obtain much information. Bold enterprise is needed. The instructions of P. F. Karl on the investment of Metz in 1870 are quoted. The Red Prince would have no nonsense about undisturbed potato picking by the enemy, and, it is needless to say, would not tolerate the pretty familiarities between outposts we read of in Napier. "Circumstances demand," said he grimly, "that the enemy be kept in a state of nervous tension."

The use of special observation posts at favourable points is dwelt on. The author draws attention to the "Felddienst-Ordnung," recommending the outpost points being relieved at irregular, uncertain times, so as not to draw the enemy's fire, and advises the occupation of the same portion of the outpost line by the same troops, so as to get familiar with the ground, and advocates the provision of cover for the troops, etc. At first during the investment of Metz in 1870, three men for every pace of the outpost line was the calculated strength. As the defences were strengthened, this was much more thinly held, until one division of the 7th Corps watched over five kilometres.

The author judges unfavourably the slight use of cavalry made by the French in their Outpost Regulations, by which they limit the use of that arm to cases where the enemy is distant. The Russians, on the other hand, he says, employ

cavalry freely; but their desire to watch every point leads them to split up their detachments too much, a company (200) may watch a front of 1½ miles, and as they employ no reserves of the outposts their system is weak for resistance, and is too cut and dried for efficiency. The author points out the elasticity of the German outpost system. Its strength really rests, he says, not on minute supervision, but in that thorough peace training which inculcates the most conscientious fulfilment of duty by every individual, which even where control is impossible makes the Service efficient. This sounds well, but those acquainted with the German soldier may be a bit sceptical as to the success of their outpost service without the intervention of leaders. He is of opinion that in future wars security will depend more than ever on the constant employment and efficiency of cavalry patrols in preference to standing vedettes, piquets, etc., the infantry posts being sufficient for the necessary resistance. He considers "the cavalry screen" as an unnecessary waste of power.

In the portion treating of cantonments, bivouacs, etc., the advantages of the former are well set forth, though the necessity of bivouacking in proximity of an active, enterprising foe is admitted. The necessity of officers always being near their men is insisted on, the example of the panic in the 2nd Division of the French 15th Corps at Beaumont, in October, 1870, being quoted in illustration, from which it appears that a large number of the officers were not in camp, but had availed themselves of the accommodation in Beaumont. He gives many examples, showing the number of houses required for quartering the German troops on the march in 1870. He enumerates the precautions necessary, condemning the practice which sometimes obtains of piling arms in front of the houses. He gives many examples of surprises in cantonments, through insufficient look-out and other measures.

The section on Cavalry Reconnaissance, one of the last in the book, is one of the most important. He distinguishes strategical reconnaissance before the enemy is met with, from tactical reconnaissance, but these so dovetail into one another that a real distinction is difficult. When touch has been gained it must be maintained. For strategical reconnaissance, cavalry divisions he says, should push three or four days' march ahead of the infantry columns. For tactical reconnaissance the divisional cavalry must suffice. When the opposing forces are in close contact these must do all the reconnoitring to the front, while the cavalry division withdraws to the flanks. The more active our reconnaissance, the less enterprising will the enemy be. But he thinks that reconnoitring and screening can rarely be efficiently carried out by the same body of troops. The importance of gaining early intelligence by bold forward action, of the timely transmission of reports, and of the care to inform all co-operating bodies besides those immediately covered, is once more asserted. He lays stress on the necessity for *officers* as patrol leaders, and gives examples from the Franco-German War of good and meagre reports. How easily, however, such forward action can be hindered by close country and by any infantry which may be attached to the hostile cavalry, he shows from the operations round Orleans in 1870, and from instances in the American Secessional War. Resistance to these attempts at piercing the enemy's screen, must, he thinks, lead to cavalry encounters in the early part of a campaign, at all events until the cavalry of one side proves its superiority. The author goes into the question of long-distance marches of cavalry divisions, and reminds the reader that while the main body has marched say 30 miles a day, the advanced reconnoitring squadrons have probably covered 10 or 15 miles more. He instances the pursuit of the British cavalry after Tel-el-Kebir in 1882, and Stuart's doing long-distance raids in 1862.

The author is in favour of small officer's patrols or of well-mounted officers for scouting, quoting the successful enterprise of Colonel Waters in the Peninsular War. In von Bredow's Brigade an officer's patrol usually consisted of one officer, two N.C.O.'s, six men.

The necessity for a careful look-out being kept by detached patrols is well exemplified by the short description given of the attack from Metz on Lieutenant von Toll's zug of dragoons while engaged in disabling the railway at Pont à Mousson on the 12th August, 1870.

He gives instances from von Widdern's "Critical Moments" and other sources of the action of cavalry patrols. Here are included some remarks on *Reconnaissances in Force*, which the Germans do not favour. They are only considered justifiable when they can be supported in a short time by the whole force—in fact, somewhat as advanced guard actions. Captain Balck gives an interesting sketch of the Russian cavalry reconnaissance system as carried out by their cavalry divisions, and a detailed account of the work done day by day by the German 4th Cavalry Division from the 17th to the 26th August, 1870.

A short chapter on cyclists shows that the author is in favour of their employment with cavalry divisions.

The last chapter deals shortly and clearly with supply.

From the above necessarily inadequate account it will be seen that this volume of Captain Balck is comprehensive and interesting. Perhaps it is too bulky to be read by English regimental officers, but it may be commended to the editor of "Staff Duties," that admirably condensed English publication of similar scope, as containing much useful information for his new edition, which is now being eagerly looked for.

Is War now Impossible? By L. S. BLOCH. Translated from the Russian. Crown 8vo. London, 1899.

Tunisia. By HERBERT VIVIAN. 8vo. London, 1899.

Souvenirs d'un Cavalier du Second Empire. By Captain H. CHOPPIN. Crown 8vo. Paris, 1898.

The Construction of Ordnance. By Major C. C. DU PRÉ. Demy 12mo. London, 1899.

Short Tactical Studies. I. The Battle of Wörth, August 6th, 1870. By Lieut.-Colonel G. F. R. HENDERSON. 8vo. Yorktown, 1899.

Dictionary of Dates. By JOSEPH HAYDN. 22nd edit. Edited by Benjamin Vincent. 8vo. London, 1898.

Military Memoirs of Great Britain; or, a History of the War 1755-1763. By DAVID RAMSAY. 8vo. Edinburgh, 1779.

Impressions of South Africa. By JAMES BRYCE. 8vo. London, 1898.

The Queen's Service. By HORACE WYNDHAM. Crown 8vo. London, 1899.

With the Boers in the Transvaal and Orange Free State in 1880-81. By C. L. NORRIS-NEWMAN. 2nd edit. 8vo. London.

Great Sea Fights, 1794-1805. Navy Records Society. Edited by Rear-Admiral T. STURGES JACKSON. Vol. I. 8vo. London, 1899.

The Russian Fleet under Peter the Great. Navy Records Society. Edited by Vice-Admiral CYPRIAN A. G. BRIDGE, K.C.B. 8vo. London, 1899.

Militärische Werke III.—Kriegsgeschichtliche Arbeiten. Zweiter Theil. Kritische Aufsätze zur Geschichte der Feldzüge von 1809, 1859, 1864, 1866 und 1870-71. By Graf H. von MOLTKE. Published by the General Staff. 8vo. Berlin, 1899.

The Council of the Royal United Service Institution have heard with great regret of the death of their colleague Vice-Admiral Philip Howard Colomb, who died at his residence, Steeple Court, Botley, Hampshire, on the 13th instant, at the age of sixty-eight. He was the third son of the late Lieut.-General George Thomas Colomb, and elder brother of Sir John Colomb, M.P. for Great Yarmouth, late Captain Royal Marine Artillery. He was born in 1831, entered the Navy in November, 1846, and served in the following year off the coast of Portugal in the suppression of the insurrection. He was midshipman of the "Reynard" in the suppression of piracy in the China seas in 1849-51, and was totally wrecked on the Plata Shoal in 1851. He served as midshipman and mate of H.M.S. "Serpent" during the Burmese War of 1852-3; and in 1854 was mate of H.M.S. "Phœnix" in the expedition to the Arctic regions. As lieutenant of the "Hastings" he took part in the Baltic expedition, and was at the attack on Sveaborg. From 1858 to 1861 he was employed on special service as a member of the Ordnance Select Committee. He introduced a system of signals into the Army in 1859, and the present system of flashing signals for night, day, and in fog. The latter system was adopted by the Navy in 1867. As a commander, he had special service in the Channel Fleet in revising the signal system, and devising the system of steam tactics ever since used in the Navy. He was in 1867 attached to the Royal Engineers to perfect the system of military signalling. He commanded the "Dryad" in 1868-70, was captain of the "Audacious," flag-ship in China, in 1874-77, and commanded the "Thunderer" in 1880-81.

In April, 1870, he was made captain. In 1873 he invented the system of interior lighting for war-ships, now used as alternative to the electric light, and in the following year he issued his "Manual of Fleet Evolutions," an official publication. His next post was as captain of the Steam Reserve at Portsmouth from 1881 to 1884, during which period he re-organised the reserve throughout, and drew up fresh instructions. He also produced the adopted system of voice tubes in ships of war. From 1884 to May, 1886, when he was compulsorily retired for age, he was flag-captain at Portsmouth, and chairman of the Committee on Naval Stores. After his retirement he served as chairman of the Committee on the Fouling of Ships' Bottoms, and was president of many Departmental Committees, including those on victualling stores, invasions, etc. He attained the rank of retired rear-admiral in 1887, and was advanced to that of vice-admiral in 1892. The admiral was a well-known writer on naval subjects, both in professional and non-service journals, and was the author of many works. He was a Fellow of the Royal Geographical Society, a Younger Brother of the Trinity House, nautical assessor to the House of Lords, and a member of the Council of the Royal United Service Institution, in the work of which he took the greatest interest.

In 1877 he won the gold medal of the R.U.S. Institution for his essay on "Great Britain's Maritime Power: how best developed as regards fighting-ships, the protection of commerce, the naval volunteer or supplemental force, colonial and home defence, and the classes, armament, and description of the vessels needed, and the re-organisation required to secure a powerful and economic Imperial naval force."

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